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A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

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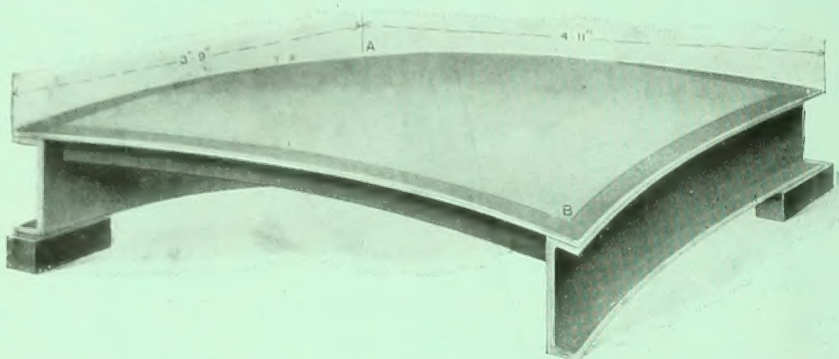
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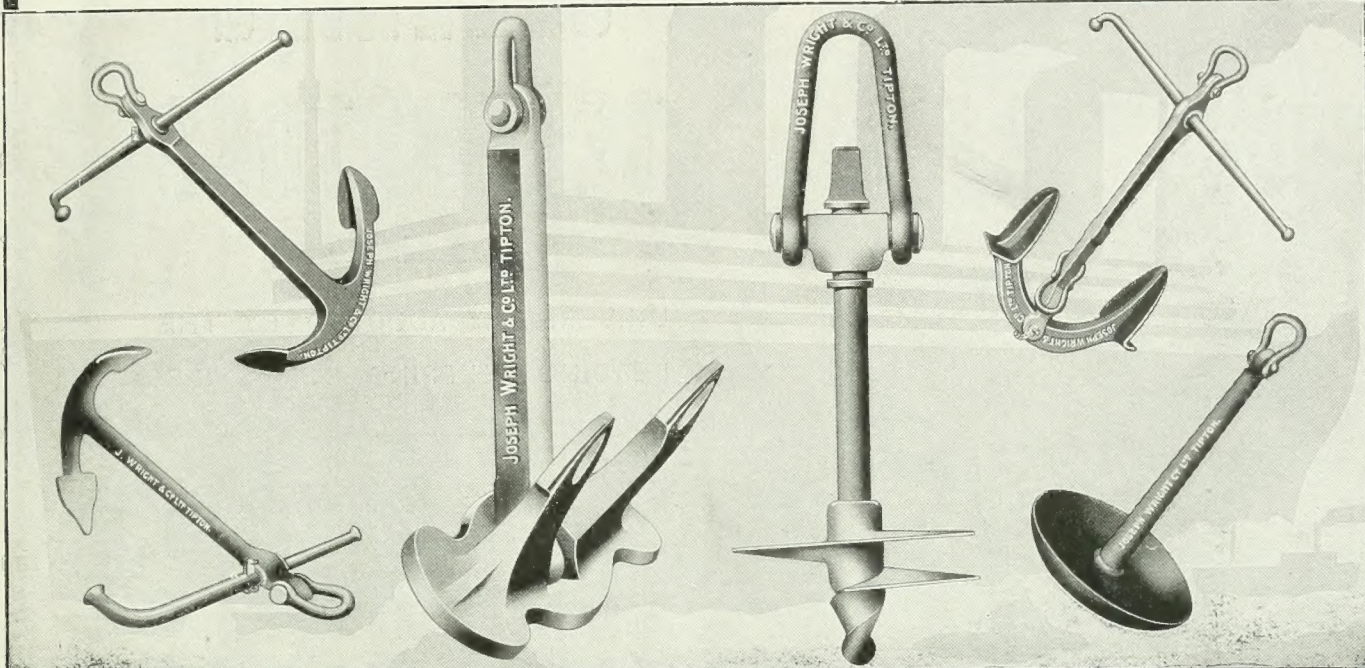
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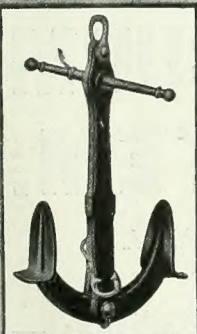
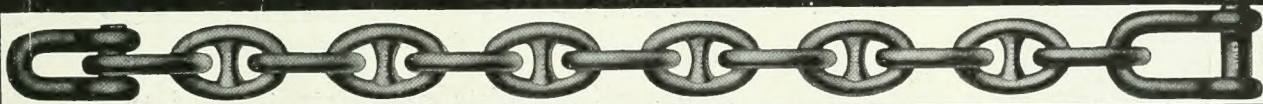
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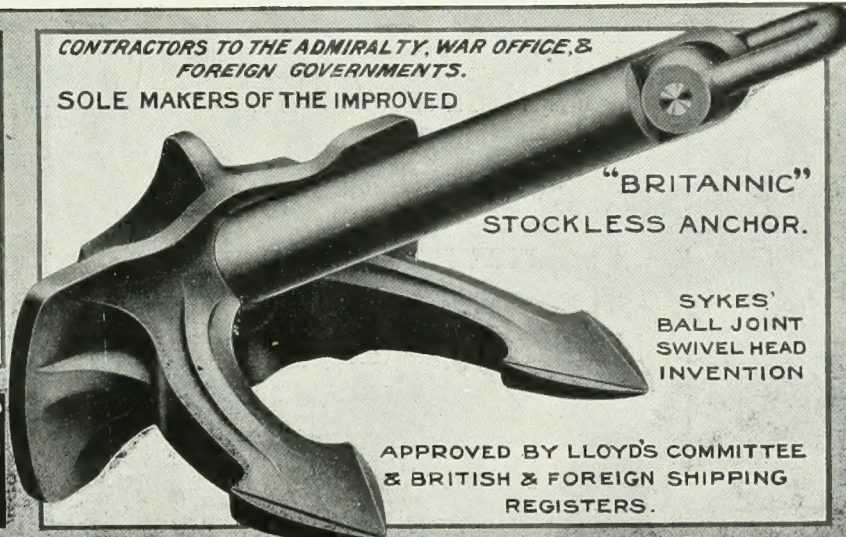
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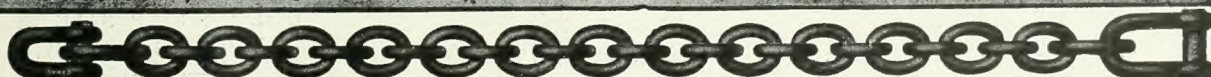
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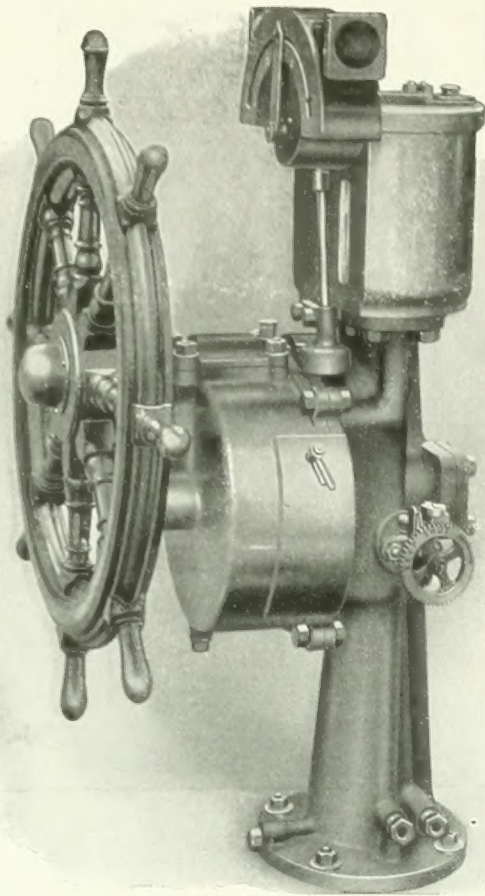
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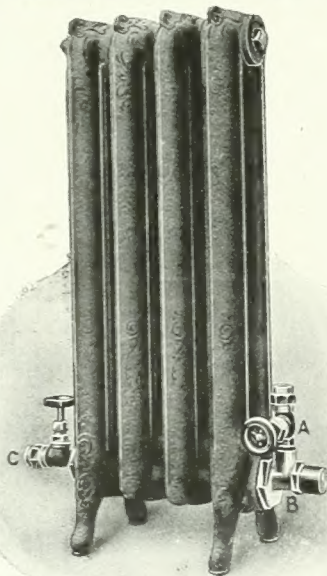
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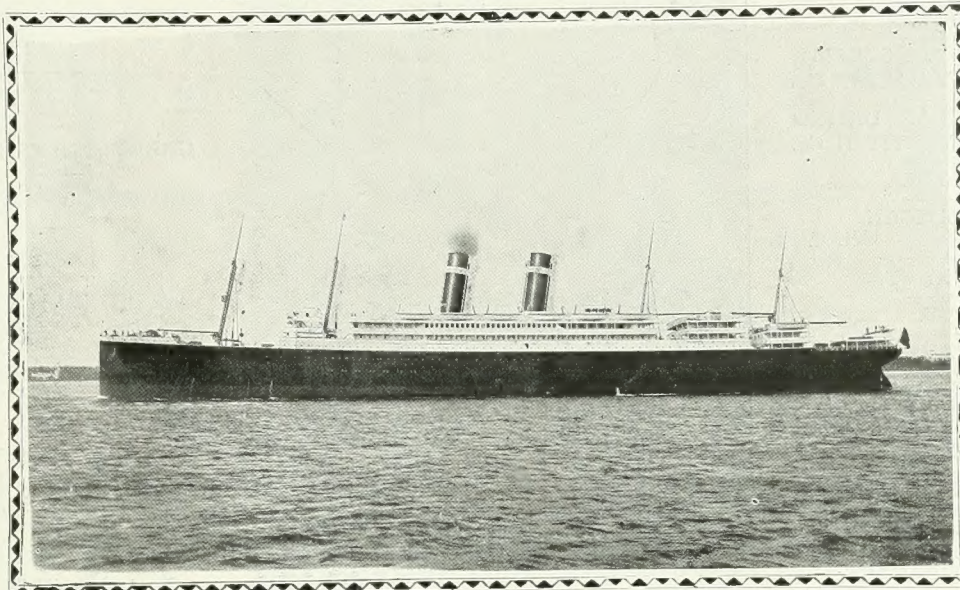
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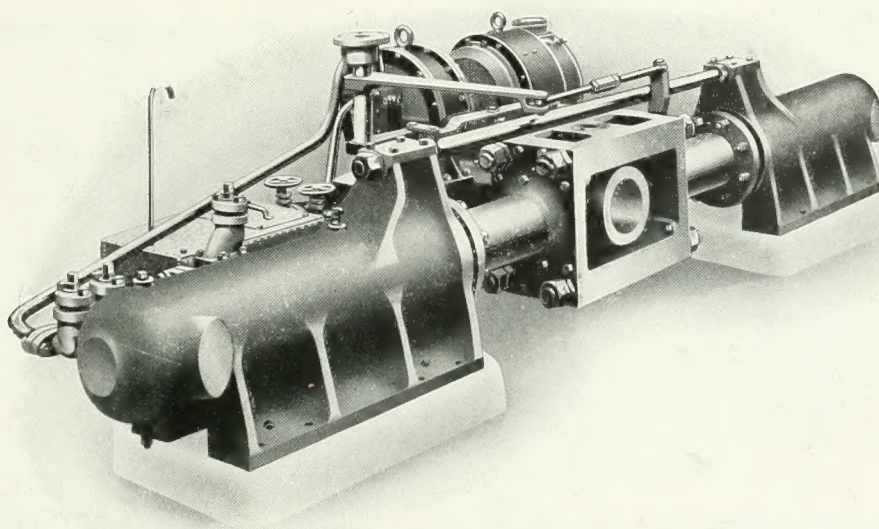
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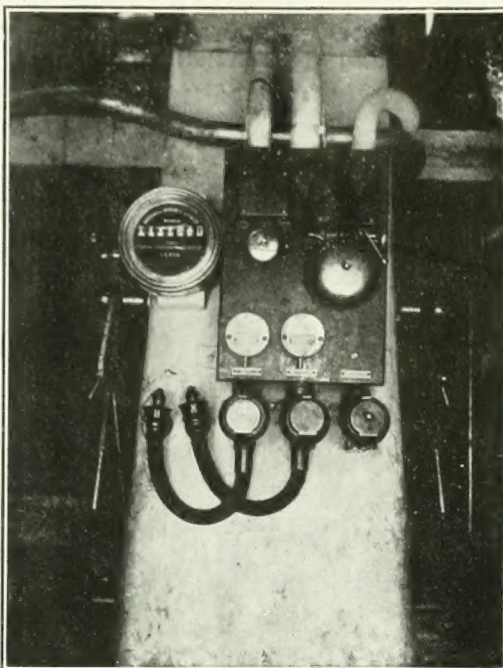
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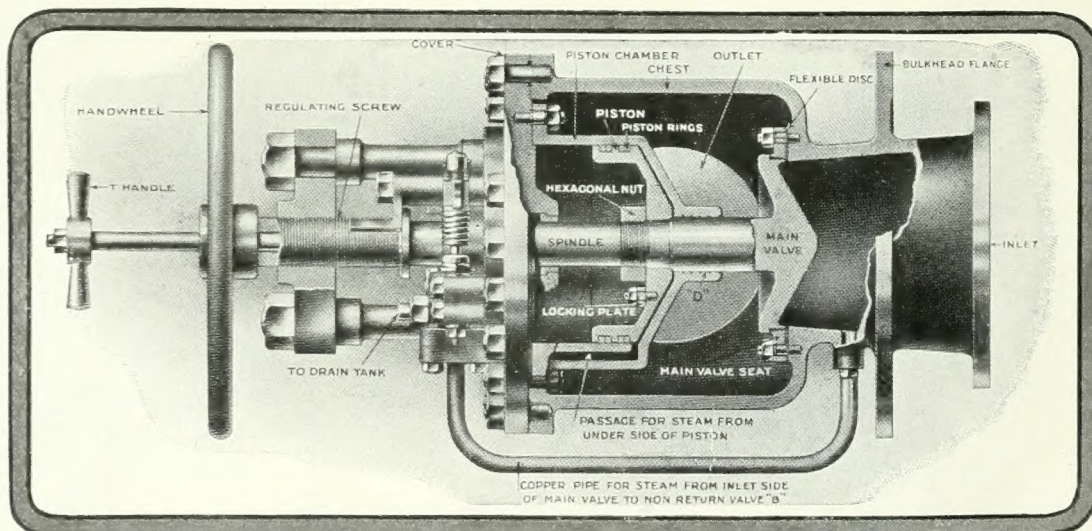
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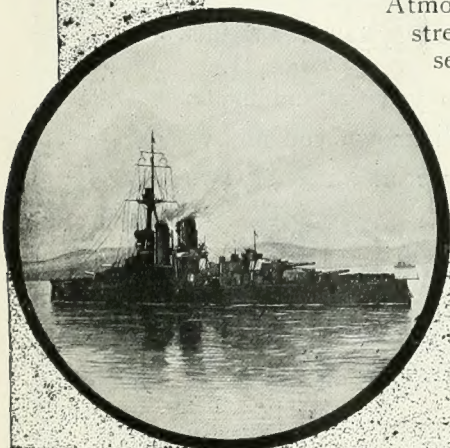
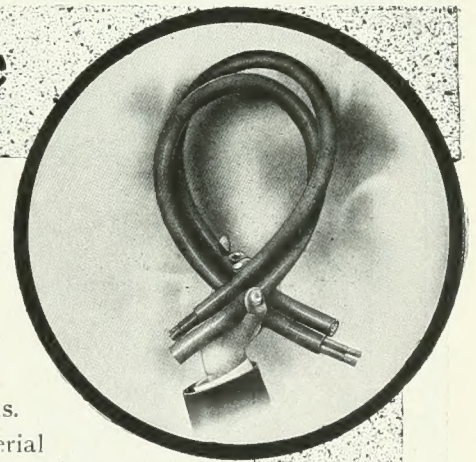
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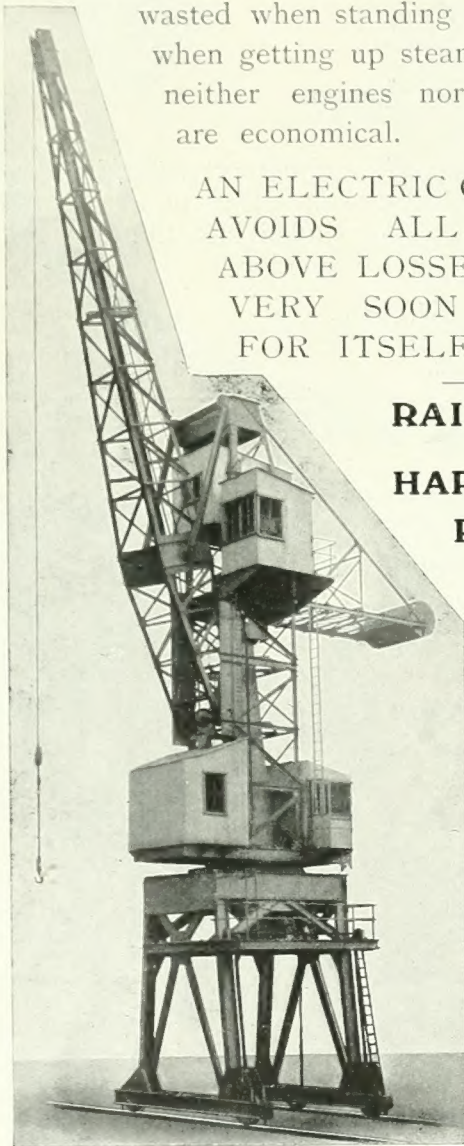
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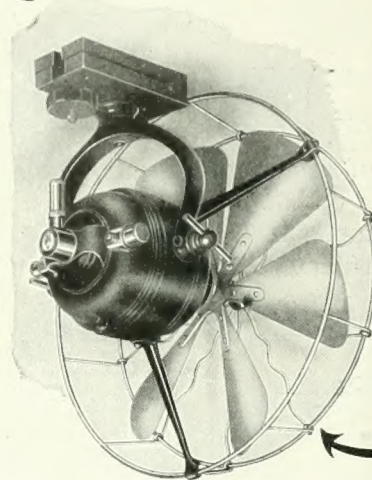
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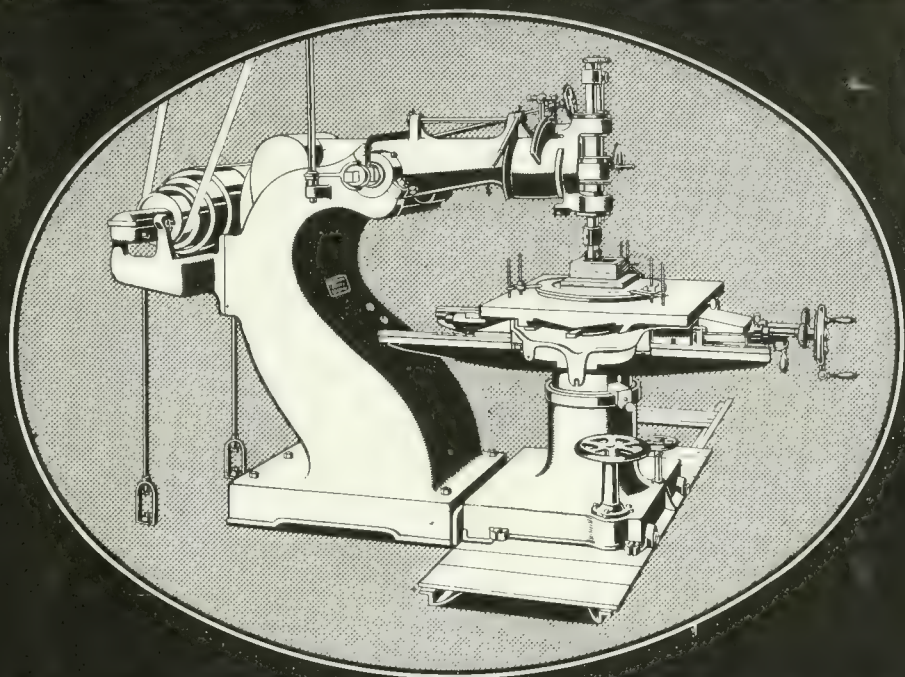
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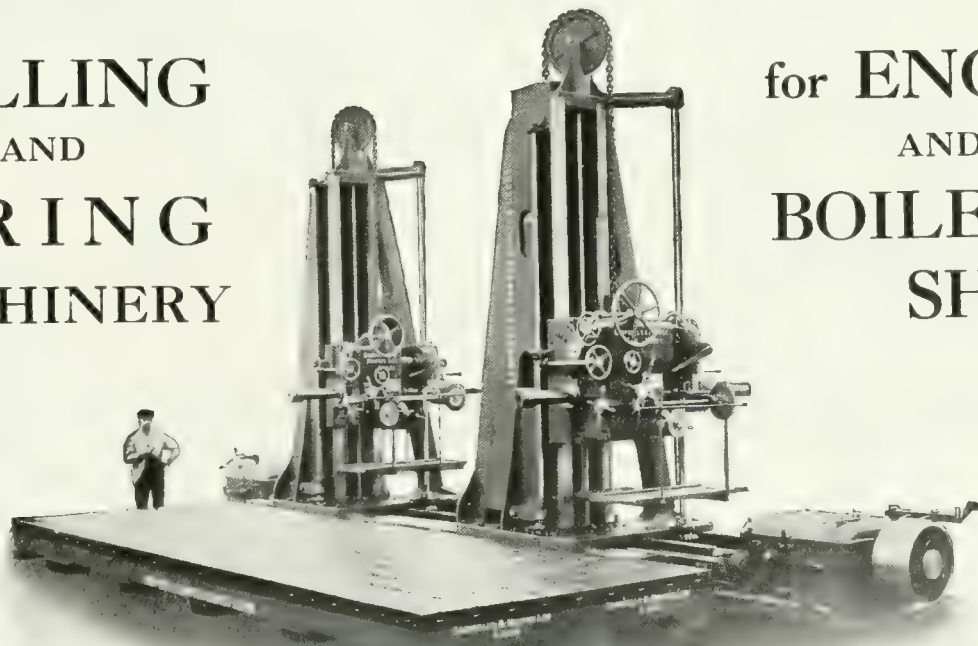
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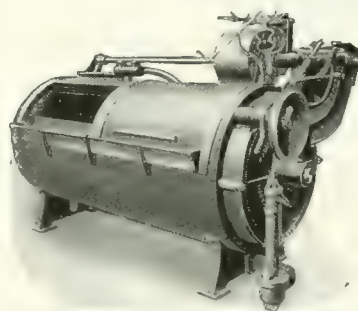
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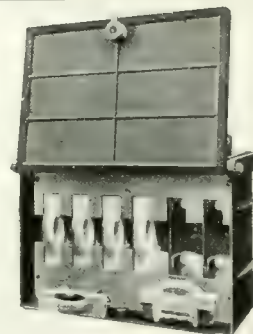
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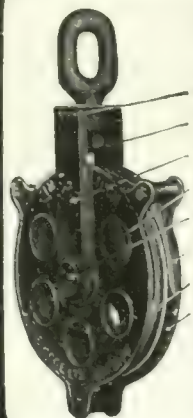
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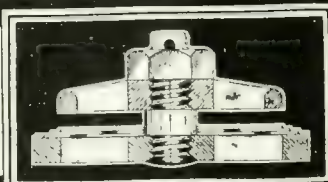
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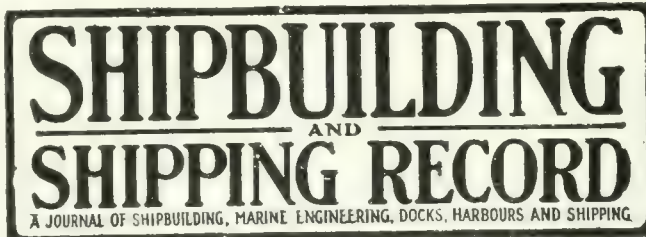
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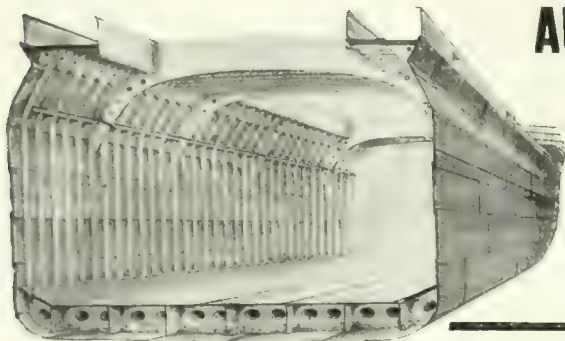
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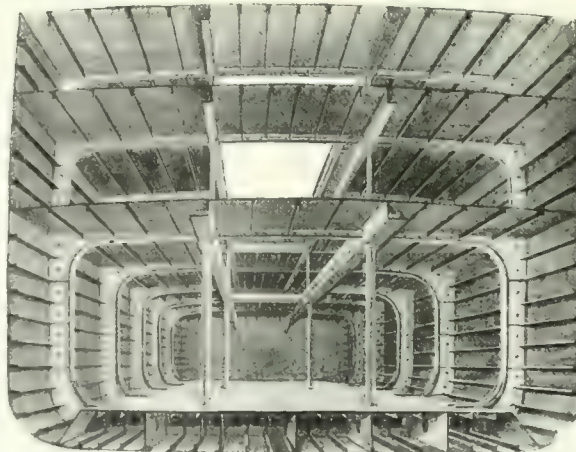
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GENERAL NEWS SECTION.....

OFFICIAL NOTICES AND SHIP SALES.....

SHIPPING SHARE MARKET.....

IF America ever placed much reliance upon the promises of the German ambassador, that faith must be rudely shaken by events. Last week Count Bernstorff informed Mr. Lansing, the Secretary of State, that the German Government had agreed that liners would not be sunk by German submarines without warning and without ensuring the safety of the lives of non-combatants provided that the liners did not try to escape or offer resistance. Within five days a German submarine had sunk the Allan liner *Hesperian*, and violated every promise that Count Bernstorff had given. We observe that in America the chorus of praise at the outcome of Mr. Wilson's diplomacy has fallen away. The German promise was narrow enough. It related to passenger liners alone. Other classes of merchant vessels are evidently to be sunk at sight as heretofore, since the Harrison liner *Dictator* has since been sunk. If Mr. Wilson was working to obtain an observance of the rules of international law by the German submarines, he failed to secure it, because those rules cover all merchant vessels. No protection for the lives of non-combatants on board vessels may be assumed from German promises. Any relaxation of Teutonic barbarity may be ascribed to the efficiency of the British measures for encountering submarine depredations. The criminal taint is so strong in Teutonic policy, that the promise to reform is thrust aside when the opportunity for further crime presents itself.

The new regulations restricting the sale of intoxicating liquors in the Clyde industrial area have now been in force for nearly three weeks. During that time there has been an appreciable improvement in the time-keeping of workers in shipyards and engineering shops, but it is as yet too soon to say what the exact effect of the restrictions will be. In one direction, however, there can be no doubt as to the good effect of the restrictions imposed on the sale of intoxicating liquors in Glasgow. The Order of the Central Board of Control (Liquor Traffic) has practically solved the shipowners' problem of obtaining crews of sober seamen and firemen. It was possible, as a rule, to secure men of a sort at the last moment, but in order not to miss a tide, steamers have frequently had to leave Glasgow Harbour shorthanded and to wait at the Tail of the Bank until men could be sent to them. Since the coming into force of the new regulations, liner and tramp steamers, whether sailing during the week or on Saturdays, have practically had their full complements of men on board in good time.

A fresh aspect of the effect of the war on marine insurance has recently been brought into prominence by the expiry of insurances on steamers which, caught in Baltic ports on the outbreak of hostilities, have been forced to remain there for safety, and are, in fact, still laid up. On these in many cases a return for lying-up for 12 periods of 30 days, has been collected, and underwriters find themselves with the port risk premium only left in hand. This represents a fairly certain if small profit, though casualties such as fires and explosions may have occurred, and occasioned heavy claims. The fact that a steamer insured at the rate of 8 guineas per cent. returns all except 27s. per cent., if laid up for 12 months abroad, must also be taken into consideration. This means that, given a sufficient number of such cases, the hole made in the year's premium is a considerable one. Against this may be set off the returns which would have been collected on steamers lost by war perils. Under the *Easby Abbey* judgment no "return for cancelling" can be claimed on the marine policy when the vessel has been lost by a war risk while the potential lying-up returns which she might have earned after the date of the loss also remain in the underwriters' hands.

It is well that underwriters did not rely on the specious promises made by Germany with regard to submarine attacks. As we have already mentioned, the *Arabic* left the market undisturbed, and "The Room" was equally unaffected by the unfulfilled promise of comparative immunity for liners, in the future. It is unfortunate that the *Hesperian*, which is the latest victim, at the time of writing, should have had the United States mail on board, as well as the Canadian mail which she was scheduled to carry. This will mean that underwriters on registered post and like interests may find that they have the equivalent of two full lines in one bottom. Such an occurrence is always to be reckoned with as unavoidable. With regard to cargo, there was not much on board for the outward voyage and the loss will not be heavy. The loss of the hull will, of course, come under the Government war risk insurance scheme, but it is interesting to note that the marine risk policy is done on a value of £155,000. This risk is, of course, an arrival for underwriters on it, as the vessel having sunk no claim can be incurred in the future, while unrepaired damage from previous casualties, if any, is not recoverable, and no return of premium can be collected for the unexpired period. The *Hesperian* was a vessel of 9,599 tons gross register, built by A. Stephen & Sons at Glasgow, in 1908. She was fitted with wireless, submarine signalling, and refrigerating plant. This is the first loss due to a war risk the Allan line have suffered, and the first loss of any kind since 1909, when the *Laurentian* was wrecked.

The "Hesperian" Loss.

The newspaper placards which on Monday night announced in big letters "Million Cargo Lost," furnish an instance of the extraordinary ignorance of shipping matters which exists among the editorial staff of our daily Press. The *Marie*, which is the vessel whose cargo is estimated to be worth £1,000,000, by our daily contemporaries, is an old iron steamer of 880 tons gross register, owned at Stavanger by Mr. Georg. T. Monsen. She was on a voyage from Genoa to London with a general cargo when she caught fire in the Bay of Biscay, the crew being saved by the Greek steamer *Marcella*. Where the idea of a cargo worth a million originated it is hard to say. The reports of the casualty which have reached us from Port Talbot give no indication of the nature of the cargo carried. As a matter of fact, she had on board a certain amount of quicksilver, a commodity which has recently trebled its already high price, but a moment's reflection will show that it is impossible for a general cargo amounting to 1,200 tons at the utmost to reach a value amounting to seven figures. Even if it were possible it is highly improbable that such a valuable cargo would be trusted to a vessel of the size, age and nature of the *Marie*. Perhaps the explanation of the canard can be found in a report giving the value in Italian currency, as 1,000,000 lire, which in the hands of a bright sub-editor could make a startling paragraph worthy of a startling poster.

The paper read by Dr. Imaoka at the recent session of the Japanese Institute of Naval Architects, an abstract of which paper appears on page 207, throws some light on the influence of the war on Japanese shipping and shipbuilding. Much has been heard lately of the big boom which shipbuilders have experienced in that country, and Dr. Imaoka, in an analytical table, shows just where the orders have been placed and what is present construction and what is new. This is particularly valuable in view of the reiteration of orders by some contemporaries who thus give an exaggerated impression of the amount of new constructional work. Dr. Imaoka points out that a similar acceleration in building took place during and immediately after our Ally's wars with China and Russia, but then the surplus was passed on to British builders. With shipbuilding congestion in the United Kingdom owners in Japan have had to be content with longer deliveries the while shipyards there are working to their fullest capacity. The only persons likely to benefit in this country are the steel makers—provided they can in price and delivery cope with American competition—and the manufacturers of accessories.

Under the Munitions of War Act "any rule, practice or custom, not having the force of law, which tends to restrict production or employment" is suspended. In fact, however, there has been no relaxation of restrictive rules, practices, and customs, the workmen taking the view that each represents a trade right which must be maintained even if the armed forces of the Crown suffer in effectiveness as a consequence. The position which they take up is, of course, wholly unreasonable, for the Act which says the restrictive rules, practices and customs must be suspended also stipulates that when the war comes to an end they shall be restored to their former effectiveness. There is no doubt about that. The first and second clauses of the Second Schedule are quite clear on the point. According to Clause I:—"Any departure during the war from the practice ruling in the workshops, shipyards and other industries prior to the war, shall only be for the period of the war." Clause II goes further:—"No change in practice made during the war shall," it says, "be allowed to prejudice the position of the workmen in the owners' employment, or of their trade unions in regard to the resumption and maintenance after the war of any rules or customs existing prior to the war." There is somewhat

similar provision in the Shells and Fuses Agreement. The actual words of the Schedule are in the Treasury Agreement. The undertaking is given statutory effect in the Munitions Act. Yet the commonest assertion one sees in the literature of Trade Unionism is that the restoration of pre-war conditions depends merely upon the promises of employers. As the Employers' Federations never break their promises the statement is unworthy of Trade Unionists. But the restoration of pre-war conditions does not depend only upon the promises of employers. The undertaking has the force of law, and in denying that it has, the men are acting not only unfairly but a little childishly.

In Mr. Balfour's most recent letter to a correspondent on the subject of Germany's submarine piracies, there is one statement which at first sight the average man will probably regard as curious. The First Lord is making the point that the submarine warfare against merchant ships is futile, and this is how he does it:—"It may interest you to know," he says, "that while the losses inflicted upon German submarines have been formidable, British mercantile tonnage is, at this moment, greater than when the war began." The desire of the public to know more exactly the damage which has been inflicted on the pirates is natural. But, after all, it is less necessary to satisfy public curiosity than it is to safeguard public interests. That British mercantile tonnage should be greater than it was when the war began seems, as we suggest, to be a curious fact. It is not, however, very curious after all, for during the eight months of this year up to and including August, Clyde firms, for instance, have launched 170,268 tons gross. How much they put into the water in the five later months of 1914 we are not at the moment able to say. Let us, however, take the average per month for 1915 and assume that the output for the five months was 76,415 tons gross. We get, therefore, for the Clyde alone an aggregate contribution for the 13 months of 246,683 tons. To that has to be added the output of other centres so that notwithstanding our concentration on naval work, we have been able to build merchant ships more quickly than Germany's submarines have been able to destroy them.

The advent of the all-big gun ship had the effect of rendering obsolete the battleships built before the Dreadnought era. This was brought about through the overpowering offensive qualities of this type as compared with the vessels of mixed armament. The fighting power of battleships is a measure, to a large extent, of the weight of the effective broadside, and the adoption of 10 or 12 big guns, against the 4 previously fitted, gave the new type such an enormous advantage that the older type were rendered ineffective in comparison. This fact soon became apparent to naval constructors the world over, with the result that the Dreadnought type was at once universally adopted. Although such has been the case in battleship construction, the development in the designs of submarines has not had a like effect. The submarine is unique in that it is the first weapon that does not become obsolete by building a superior weapon of the same type. Within the past decade the size and speed of under-water craft have been enormously increased, but the older type are still effective in fulfilling the duties for which they were designed. The increase in dimensions has been brought about by the desire to obtain greater radius of action, higher speeds, and better habitability. For submarines intended for coastal defence neither large radius of action nor high speeds are necessary, and the duties can be as effectively performed by vessels of 200 tons displacement as those ten times larger. Any vessel which is capable of being manœuvred under water, and is fitted to carry and fire torpedoes, or to plant mines, is an exceedingly dangerous craft, and the older, slower and smaller type can fulfil these functions quite as well as

Germany's Futile Piracies.

Do Submarines become Obsolete?

Men and Munitions Act.

the larger and faster vessels now being produced. The effectiveness of the older submarines in the British navy has been amply demonstrated by their exploits, and there need be no fears that future development in submarine design will render them less effective than they at present are.

Certain firms are world famous for their skill in the building of fast shallow-draught vessels. Only by a vast amount of experimenting and years of experience have they been able to achieve the wonderful results obtained. When a vessel of about 50 ft. in length attains a speed of about 15 miles an hour on a limiting draught of 1 ft., the result can only be considered remarkable. The solution of the problem of the efficient screw propulsion of shallow-draught ships lies in the adoption of the tunnel system. It was early recognised that for the efficient action of the screw propeller when immersion is limited, air must be prevented from finding its way into the region of low-pressure forward of the screw, and this was done by so forming the hull that the water surface in the neighbourhood of the screws is effectively covered by the surface of the hull. The atmospheric pressure is capable of supporting water in a space extending far above the external water surface so long as air cannot enter. When a shallow-draught vessel is at rest air may be in this space, but the action of the propellers drives out the air and the screws work in solid water. By thus arching the hull in the locality of the screws the diameter of the propellers may be from two to three times the limiting draught. Various other means have been invented for the efficient propulsion of shallow-draught vessels. The turbine propeller, introduced by Thornycroft, enabled reduction in diameter of propeller to be attained, for by the particular direction of the propeller race effected by the turbine propeller an increase in thrust was obtained for a given diameter of propeller. Yarrow have fitted in many such vessels a patent flap arrangement at the after-end of the tunnel. It was found that the falling portion of the tunnels immediately abaft the screws added materially to the resistance, but this flap can be raised when the water has been expelled from the tunnel, and this allows the water to pass freely aft from the propeller. By such means very efficient propulsion is attained.

Certain recommendations have been made by the Federal Board investigating the causes of the *Eastland* disaster. It has been suggested that a Board of competent naval architects should consider the stability question of every ship prior to its construction. Registration societies in America, as in this country, do not concern themselves about the stability of the vessels built under their supervision. This important matter is left entirely to the naval architect, and occasionally mistakes are made. In several cases which could be cited, the piling up of erections has rendered the vessels unstable, and in the case of one liner recently constructed a large amount of permanent ballast was found necessary in order to ensure safety. This will prove a loss to the vessel during her whole career, as the deadweight capacity has been reduced by the amount of ballast put on board. Such a Board as has been proposed, might prove of use in many cases, especially when the initial stability of purely passenger ships for river or lake service is being considered. In these ships the worst possible conditions must be assumed. For investigating the stability of the bulk of merchant ships, however, this proposed Board would be of little use. The safety of the majority of liners lies in the judicious use of water ballast, and this must be left to the officers in charge. It would be utterly impossible to afford such vessels sufficient beam to make them safe no matter how carelessly they were loaded or ballasted. A great deal, therefore, is left to the judgment and care of those in command and it points to the necessity of ship officers being sufficiently instructed in the subject

of initial stability to enable them to ensure the ship's safety by judicious loading and ballasting.

Elsewhere in this issue will be found an abstract of a discussion on the subject of "Tail Shaft Lubrication," which took place at the Institute of Marine Engineers. In the course of the discussion referred to one of the speakers described the details of an appliance specially designed for lubricating tail shafts, and his remarks are reproduced in the abstract which appears on page 205. A marine engineer who was present expressed himself very much interested in the description of the lubricating system, and desired to raise one or two points in connection with it. In the first place, he said that he was not entirely sure that it was necessary to have a tail shaft mechanically oiled at all, and if one could be quite sure of the grease being about two-thirds of the way along the tubes it would certainly flow in sufficient quantities to give all the lubrication required. The shaft lubricated on the system described was not likely to suffer from lack of lubrication, but from overdoing it in that respect, inasmuch as on a ship of the size indicated the surfaces are greater in comparison with larger vessels. Unfortunately in describing the system no mention was made of the speeds of revolution, but it might be taken that these would be quite normal, namely, 100 r.p.m., or thereabouts. The speaker remarked that it would help matters economically if the lubricant were entered at the forward part of the tube into suitably arranged bearings with additional but smaller feed near the propeller. The quality of the grease is important and the pressure would be about 9 lb. per sq. in. The smaller feed would keep the water entirely away from the shaft. A good reliable system of lubrication is worth considering, and in regard to the tail shaft the very hard work thrown upon it by the motion of the propeller adds to the importance attaching to it.

In his recent contribution to the Transactions of the Institution of Naval Architects, Mr. Johns drew attention to the close agreement between the results obtained with experiments on air and water propellers. It was found that when the densities of the two media were taken into account the thrusts obtained were in agreement and that the efficiencies agreed at low speeds. Certain differences were, however, found to exist. For example, the thrusts of air propellers did not increase in all cases as the square of the speed, and the efficiencies were found to increase with increase in speed. These peculiarities have not yet been demonstrated on water propellers. The attainment of remarkably high efficiencies in propellers designed by the Drzewiecki, or constant incidence method, has caused some speculation as to the applicability of this method of design to water propellers. It is claimed that propellers of such design give, in air, an efficiency as high as 85 per cent., whilst the highest obtained with water propellers is 78 per cent., and that over a very small range. The probabilities of the applicability of this method of design to water propellers were recently discussed by Assistant Constructor Rossel in a paper read before the American Society of Naval Engineers. The conclusion he came to was that whilst this method was well adapted to air propellers it had not yet been proven that the high efficiencies which had been obtained were due to the use of the constant incidence method but to the more efficient blade sections which had been discovered. In that finding there is little hope that the efficiencies of water propellers may be increased. Captain Dyson has drawn particular attention in his book on propellers to the importance of the shape and especially the thickness of blade sections, and these points have also been thoroughly dealt with by Taylor. It is important that narrow propellers should be as thin as strength considerations will allow, as a considerable loss in efficiency accompanies increase in thickness. Aeroplane propeller blades are very narrow, but the necessity for

great use in high speed ship propellers in order to obviate cavitation towards the adoption of narrow blades. There is thus a wider field for experiment in type of blade section of air propellers than in those of water screws.

HARBOUR AUTHORITIES AND THE GOVERNMENT.

A QUESTION largely occupying the minds of dock and harbour authorities at the present time is that of payment by the Government for the services and accommodation utilised by warships, Admiralty vessels and transports at the various docks throughout the kingdom.

It is common knowledge that since the outbreak of war the authorities have done all in their power to facilitate the work of the Government by rendering services in connection with the docking and berthing of vessels and reserving for that purpose all necessary accommodation. When the question of remuneration was raised, the Admiralty, as was anticipated, had recourse to Section 28 of the Harbours, Docks and Piers Clauses Act, 1847, which provides that "any vessel belonging to or employed in the service of His Majesty . . . shall have the free use of the harbour, dock or pier without any charge or rate being made for using the same." This, it was alleged, entitled the Government to exemption from dues on the ground that the ships using the ports and the cargoes, munitions, &c., dealt with at the quays were either the property of, or being utilised in the service of the Crown. This decision being objected to, the authorities were subsequently offered payment based on 75 per cent. of the dues other than harbour or conservancy dues.

An interesting side to this question lies in the fact that railway-owned docks are not affected, as under the arrangements entered into between the Government and the railway companies in pursuance of the Regulation of the Forces Act, 1871, such docks are rightly considered as part and parcel of the railway undertaking, and are thus entitled to adequate compensation in conjunction with the railway undertaking. Wherefore it is argued that it is unfair that a certain proportion of the docks of the country should be subject to full compensation whilst the remainder have either to accept the offer of 75 per cent. of the ordinary charges or be subject to claims for exemption under the 1847 Act. It is difficult to understand the drawing of a distinction between the payment for dock or quay services and the dues in respect of conservancy charges. Conservancy services are as essential and important as dock services. It is just as reasonable to levy charges towards the cost of providing and maintaining a navigable waterway by means of buoys, lights and constant dredging as it is to ask for remuneration in return for dock accommodation and quayage. In the absence of the functions performed by a river or harbour conservancy the dock would not be accessible, and the distinction must, therefore, be considered an invidious one.

Even in normal times, the presence of Admiralty vessels—though admittedly essential—tends to restrict the ordinary commercial work and activity of a port, particularly if it be a base for destroyers or other war craft. The brief visit of a squadron is, however, of a temporary character, and inasmuch as it is often made the object of a fête and consequently brings additional trade to the port for the time being, the exercise of the Admiralty's powers has been looked upon benignantly by harbour authorities generally. But in war time the difficulties are immeasurably increased, for not only has accommodation to be found and services rendered for ordinary ships of war, but also for the innumerable colliers, mine sweepers and transports engaged in the conveyance of troops and stores. It is incumbent on the dock authorities to carry on this national service, and it is equally the duty of the Government to provide that the public who have invested their money in the several dock undertakings of the country and thereby provided instruments essential for the efficient conduct of the war should be treated in equal fairness with railway and shipping shareholders.

ECONOMICAL SPEEDS.

ONE of the most important points elucidated by tank experiments is the discovery of the existence of pronounced humps and hollows in the resistance curves of ships. Every particular vessel has a limiting speed, above which it is impracticable to run her profitably, and every additional knot that the vessel is driven beyond this economical speed is only obtained by the expenditure of horse-power out of all proportion to the gain obtained. Especially is this the case with full ships, in which the humps and hollows are much more accentuated than they are in finer vessels. Take, for instance, the case of a full vessel of .827 prismatic coefficient, the (c) curves of which are given by Mr. Baker in his new book. The dimensions of this ship are 400 by 52.2 by 23.2 ft., at which draught she displaces 11,200 tons. A most pronounced rise in the resistance curve takes place between (P)_s .5 and .58, which correspond to speeds of 12 and 14 knots respectively. At 12 knots speed the horse-power necessary would be 3,400, assuming 50 per cent. efficiency, whilst 7,300 h.p. would be necessary to obtain 14 knots. Thus the power is more than doubled for an addition of only 2 knots in the speed. These humps and hollows depend, for their position and magnitude, on the wave system set up by the bow and stern of the vessel being propelled. Mr. Baker has discovered that the speeds at which good or bad interference of the bow and wave systems occurs, depend very largely on the simple product (length × prismatic coefficient), and that the critical speed of any ship is given by

$$V = 1.34 \sqrt{\frac{P \cdot L}{n}}, \text{ } n \text{ taking account of the number of wave crests}$$

between the bow and stern systems. There are hollows in the resistance curves when $n = 2, 3, \text{ or } 4$. In the case of a vessel of 400 ft. length and .827 prismatic coefficient there are hollows at 12 knots and at 14 knots, but, as already indicated above, there is a great hump between the two. The economical speed in this case is given by $V = 1.34 \sqrt{\frac{P \cdot L}{4}}$. There are therefore certain

hollows that are unattainable, and it is desired in what follows to indicate the limiting economical speeds associated with certain fulnesses of forms. Mr. Baker, in his book, gives a table indicating these, but considerable differences occur, for which no explanation is given; thus, a vessel of .595 prismatic coefficient is credited with a critical speed 1.34 times greater than that of a ship of .600 prismatic coefficient. Mr. Baker also gives no idea of the resistances of the ships at the particular economical speeds mentioned, and from this point of view the value of the table is very limited. The following figures have been obtained, largely from an analysis of Mr. Baker's and other experimenters' work, and an attempt has been made to give at the limiting speeds an approximate resistance value, which with ships of normal proportions and form, would be appropriate to that speed.

HIGHEST ECONOMICAL SPEEDS, WITH APPROXIMATE (c) VALUES, FOR 400-FT. LENGTH SHIPS.

$$\text{EHP} = \frac{\Delta \cdot V^3 (c)}{427 \cdot 1} \text{ or IHP with } 50\% \text{ efficiency} = \frac{\Delta \cdot V^3 (c)}{213 \cdot 5}$$

Prismatic Coeff.	Economical V $\sqrt{\frac{P \cdot L}{4}}$	Approximate (c)
.54	1.065	.85
.56	1.060	.81
.58	.950	.78
.60	.905	.76
.64	.835	.74
.68	.770	.73
.72	.705	.71
.76	.645	.70
.80	.585	.70
.84	.530	.70

If it be assumed that the *Mauretania* had a prismatic coefficient of .62, the limiting economical speed given by the curves would be $.87\sqrt{L}$, which would be 24 knots, and the (c) value given in the

table is .75. Allowing for the length correction this would become .72, and the approximate effective horse-power for 24 knots speed and 37,000 tons displacement becomes 26,000, which agrees fairly well with those given by Mr. Peskett to the Institution of Naval Architects. In the case of this vessel an increase of a knot in speed above that given by the above table could be reached with a little increase in the $\left(\frac{C}{L}\right)$, which value does, however, begin to increase whenever the $\cdot 87 \sqrt{\frac{V}{L}}$ value is passed.

As has already been indicated the resistance curves of very fine vessels are not so humpy as those of fuller vessels; it is therefore more difficult to determine clearly the limiting speed. For example, the cross-Channel steamers *Normannia* and *Hantonia*, of 290 ft. in length, attained a speed of 19.7 knots on trial, which gives a $\sqrt{\frac{V}{L}}$ of 1.16. This excess in speed above that indicated by the table could only be obtained by a decided increase in $\left(\frac{C}{L}\right)$. Fast cross-Channel steamers, as a rule, are designed to steam at speeds corresponding to about 1.15 or 1.2 $\sqrt{\frac{V}{L}}$, in which regions of speeds the $\left(\frac{C}{L}\right)$ values vary approximately from 1.0 to 1.2. In full and slow vessels, where economy is essential, the limiting speeds given above are good average practice.

It is not claimed for the table given that it is anything more than a fair and rapid guide to what are the appropriate speeds for certain fullnesses, and an approximate guide to the determination of power. Many points come up which will modify the latter, particularly such as proportion and form. These speeds may, in certain cases, be slightly exceeded without material increase in the resistance, but this should be done only when direct guidance is obtained, either from past experience or tank results.

TAIL SHAFT LUBRICATION.

IN a recent volume of the Transactions of the Institute of Marine Engineers there appears the report of an interesting discussion on "Tail Shaft Lubrication," which took place at one of the meetings of the Institute towards the end of last session. In introducing the subject Mr. Adamson remarked that marine engineers are more familiar with the ordinary style of fitting the stern tube enclosing the shaft, and trusting to the sea water to act on the lignum-vitæ to keep the shaft running sweetly. There are waters, however, which are charged with mud or sand, especially rivers in various parts of the world, where the up river banks are overflowed periodically—for instance, the Rangoon waters; and here the disadvantage of the ordinary methods is so marked and evident by the wearing down of the bearings, necessitating frequent drawing of the shafts, overhauling and fairing these with the renewing of the lignum-vitæ, that a method is adopted in some cases of fitting an appliance for filtering the water and injecting the filtered water under pressure from the tunnel end of the stern tube into the recess, with the object of forcing the outer water away and admitting of the shafts being kept running in the filtered water. The pressure of the water depends to some extent on the draught of the ship, and is approximately about 20 to 25 lb. The lubrication of the propeller shaft by oil has been in use for many years in certain lines of steamers, and that fact alone proves its efficiency under certain conditions of running in foul waters, inasmuch as the pressure of the oil in the tube prevents the encroachment of the water from outside, and the head of oil leading to the tube can be regulated at will to suit varying circumstances and prevent waste.

As a general rule a propeller shaft runs for three to four years with the ordinary method of fitting lignum-vitæ, and no lubrication but the water, without requiring lining up, the usual limit of wear down before the shaft requires to be drawn for inspection being $\frac{3}{8}$ in. This being so, there is not much apparent need for any change of

method, save that the question of wear and tear may be brought into consideration, and the cost of lining up the tube on each occasion of drawing for examination of the shaft arises. The oil lubrication preserves the wood and thus saves the cost of renewal, plus the saving of time involved in the course of cutting out and refitting the lower staves, also the boring out—as is frequently done when time admits, and a good job is recognised as being worth the cost. It may also be noted from experience whether or not the end-grain lignum-vitæ with oil lubrication does not serve for a longer period than when fitted with the grain running fore and aft. Should experience prove the former to last for the longer period a further saving would be effected by following the course dictated by experience.

The originator of a special device for lubricating tail shafts in the engine room of steamers was invited to describe the details of his system, and in doing so he remarked that the appliance is the outcome of the necessity for doing something to overcome the trouble experienced with propeller shafts running in the water of the Thames. The water is very dirty and muddy and considerable trouble was experienced with the stern bushes. It was found necessary to discard the idea of putting a gland on the outer end of the stern tube, as the gland was invariably torn away by chance ropes fouling the propeller boss. It is considered better to feed the tube with grease and let it slowly escape from the outer end. There are some methods of feeding by hand, relying on the memory of the engineer, who might forget, and the speaker thought it better to feed automatically. An eccentric was fitted on the intermediate, or on the tail shaft; this caused the apparatus to work by means of ratchets, so getting an automatic feed, and in some boats this arrangement was adopted. In other cases the gear was fitted to the pump lever, either method giving a direct continuous feed. The first arrangement was fitted about 2½ years ago, and it has given good results. It is not claimed that it gets the whole of the water out of the tube, but it is a long way in front of lubricating the tail shaft with Thames water, which contains a great deal of grit and sand. The value of the grease that is exuded is almost negligible. The shaft is 6 in. in diam., the plunger has a stroke of 6 in., and the feed is so arranged that it lasts from two to three weeks. The engines run about 90 to 100 r.p.m. The apparatus is simple, and though it is in the experimental stage at present the results are good and encouraging. The apparatus is just a simple plunger and cup with the actuating lever; the pipe leads away to the aft end and is secured into the stern tube. When this pipe is about 15 or 20 ft. long it is better to drive off the tail shaft or eccentric shaft to reduce the pipe friction.

PUBLICATIONS RECEIVED.

[A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.]

The New Navigation. By Lieut. F. C. Cross, R.N.R. Glasgow: James Brown & Son, The Nautical Press, 52, Darnley Street, Pollokshields, E. 8½ in. × 5½ in. × ¼ in. Price, 2s. net.

This work is now in its second edition. It deals with the Marcq St. Hilaire method, which to many officers presents many difficulties. The author, who was headmaster of the White Star training ship *Mersey*, simplifies the processes, and gives numerous working examples. A simultaneous observation of sun and moon has been included, which useful problem is too often neglected on account of the popular but erroneous belief that the moon's corrections are too lengthy and tedious to undertake in practical work, in spite of the many tables published for correction of moon's altitude by inspection, e.g., "Brown's Nautical Almanac." For those who wish to calculate throughout, an example is also worked by means of Captain Simpson-Baikie's tables, by means of which the drawing of the position lines is done away with; also Lieut. Radler de Aquino's method, combined with Johnson's, is shown. The simultaneous observation of the sun and moon will be found worked in several ways, both log. and inspection methods, so that the would-be "new navigator" can take his choice.

Halifax. A Commercial and Industrial Centre. Edited by George P. Wellsworth and published by Sells, Ltd., 166-169, Fleet Street, E.C., and also at Manchester, Leeds, Glasgow and Montreal. 74 pp., 10 in., 126 pp.

This is a work issued by the Halifax Chamber of Commerce, the Halifax Chamber of Trade, and the Halifax Advertising Club. It is superbly bound in a cover of neat design and is thoroughly interesting from first page to last, in which respect it differs from many publications of its kind, which often consist of a long array of unrelieved statistical facts presented in the most dry-as-dust fashion. For the sake of convenience the volume, which is well printed throughout, has been divided into several sections, such as "Representative Bodies," "The Present Commercial Position," "A Guide for New Enterprises," "Local Information," "Halifax History in Brief," and "Imperial and Foreign Trade," followed by a section dealing with local representative firms and enterprises and a classified trades list of all the chief activities in the district.

LETTERS TO THE EDITOR.

(The following letters are published by arrangement with the Correspondents.)

IMPORTS OF CATTLE AT BRISTOL.

Port of Bristol Offices,
Queen Square, Bristol.

September 6.

TO THE EDITOR OF SHIPBUILDING AND SHIPPING RECORD.

In your news letters printed on pages 194 and 195, in your issue of the 2nd inst., your Liverpool correspondent states:—

"Irish cattle of the Board of Agriculture which come into force on September 21, 1915, will be shipped to Bristol only, and shipments will be made to Cardiff and Avonmouth will now be diverted to the Mersey ports. The Bristol Office will have the benefit of the foreign animals that will now be admitted into the Avonmouth and other cattle-raising countries which will now be admitted into this country as from September 21."

Your Cardiff correspondent states:—

As formerly the Board of Agriculture was last week gazetted permitting, as from September 21 to three months after the duration of the war, under proper veterinary restrictions the landing at Avonmouth and Cardiff, for slaughter at the port, animals from certain countries abroad. Orders were also gazetted revoking on September 21 the orders relating to the landing of Irish animals at Cardiff and Bristol.

Both of your correspondents have, no doubt by inadvertence, succeeded in conveying a totally misleading statement of the condition in regard to the cattle trade in the port of Bristol.

Irish cattle are dealt with regularly each week through the lairs in the city docks, and the Board of Agriculture have issued no orders which will interfere with this trade. At the river mouth docks at Avonmouth there are well-equipped lairs formerly used for the Canadian live cattle trade and which have now been re-opened for the contemplated imports of live cattle for slaughter from certain specified foreign countries. This in no way affects the existing Irish cattle trade.

As the statement is calculated to cause considerable uneasiness among those carrying on the trade, I should be glad if you would kindly insert this correction in your next issue.

D. ROSS JOHNSON,
General Manager.

CANADIAN WHEAT SHIPMENTS.

The visit to London of Sir Robert Borden, the Canadian Premier, has, we understand, been entirely successful, and, at all events, as regards the transport of the Dominion's new wheat crop, the record quantity of 175,000,000 bushels being available for export, no fears need now be entertained. For the purpose, a large number of vessels will be temporarily released from war service, whilst others are to be requisitioned. Arrangements are, in fact, now being made, and very soon on both the Atlantic and Pacific routes an ample supply of tonnage should be available. At present, freights are higher than they have ever been, and, owing to the coming demand for cargo boats, with a view to the shipment of grain, coal, and

munitions of war from the United States, not to mention the requirements of other countries in this connection, a further rise is inevitable. In the case of Australian trade, we learn that the Commonwealth Government has that matter well in hand, and that, as the result of co-operation with the Imperial authorities, it is hoped to overcome in greater measure the difficulties that have for some time been confronting Antipodean exporters. Until, however, the war comes to an end, and, we fear, for many months after, the tonnage problem will not be easy of solution. The output of merchant ships is decreasing, a fact which is apparent not only in this country but elsewhere, with, perhaps, the notable exceptions of the United States, Scandinavia and Japan, with the result that ocean transport must necessarily suffer. And, when hostilities are over, there is almost certain to be in the opinion of competent authorities an enormous demand in Europe for materials from outside sources to make good the wastage of war. Therefore, shipowning prospects are likely to continue quite satisfactory, while, on the other hand, shipbuilders should have no cause for complaint.

PASSENGER STEAMERS IN THE DANGER ZONE.

The Board of Trade desire to call the attention of the owners and masters of passenger steamers to the necessity of taking special precautions when the vessels are being navigated in a danger zone, with the view of preventing or lessening loss of life, in case of torpedo attack.

The following precautions are suggested:—

1. All doors in transverse watertight bulkheads should be kept closed except when necessarily opened for the working of the ship.
2. All side-scuttles, ports or other openings in the vessel's sides should be kept closed when practicable.
3. Members of the crew should be detailed to shut all watertight doors and side scuttles which must necessarily be left open, at a given signal.
4. In order to prevent the vessel taking a sudden list if holed by a torpedo the stability should be increased to the utmost extent practicable by filling water ballast tanks or otherwise.
5. If the initial stability is not so ample as to prevent any danger of a serious list, and if the vessel is constructed with longitudinal bulkheads, such as wing bunker bulkheads, precautions should be taken to allow water which may enter the vessel to flow as freely as possible through the longitudinal bulkheads; for example, the doors of wing bunkers should in such a case be left open.
6. It is impossible to ensure that all lifeboats can be launched before the sinking of a vessel struck by a mine or by a torpedo.

In the case therefore of passenger ships which enter a danger zone additional life-saving appliances should be provided in the form of apparatus stowed on deck so as to be readily got into the water, or apparatus which would float off the ship's deck on her submersion.

7. The lifeboats attached to davits should, if practicable, be kept swung out, fully provisioned, and ready to be immediately lowered so long as the vessel is in the danger zone. The usual booms should also be provided to prevent the boats swinging inboard again.
8. Lifeboats, or pontoon decked lifeboats, not attached to davits should have their covers taken off before entering the danger zone and all obstructions such as would prevent the lifeboats floating-off the vessel's deck, should be removed except the boat's girders.

9. Life-rafts and buoyant apparatus should be stowed in such a manner that they will be free to float off the vessel's deck on their girders being slipped; they should not be lashed. A wire rope with short length of chain fitted with a slip link is sufficient.

10. Life-jackets are to be placed so that they are readily accessible to all persons on board. Life-jackets in addition to the statutory complement should be carried on deck and distributed as widely as possible.

ARMED MERCHANTMEN.

Some considerable doubt having existed in the minds of the owners of merchant vessels and of those commanding them as regards such ships using defensive armaments when trading to United States ports, the Imperial Merchant Service Guild, with a view to clearing up any misapprehension, have published the rules which are in existence for the guidance of the officers of the American Government who are charged with the duty of determining the peaceful character of particular armed vessels.

These rules are as follows:—

A.—A merchant vessel of belligerent nationality may carry an armament and ammunition for the sole purpose of defence without acquiring the character of a ship-of-war.

B.—The presence of an armament and ammunition on board a merchant vessel creates a presumption that the armament is for offensive purposes, but the owners or agents may overcome this presumption by evidence showing that the vessel carries armament solely for defence.

C.—Evidence necessary to establish the fact that the armament is solely for defence and will not be used offensively, whether the armament be mounted or stowed below, must be presented in each case independently at an official investigation. The result of the investigation must show conclusively that the armament is not intended for, and will not be used in, offensive operations.

Indications that the armament will not be used offensively are:—

1. That the calibre of the guns carried does not exceed 6 in.
2. That the guns and small arms carried are few in number.
3. That no guns are mounted on the forward part of the vessel.
4. That the quantity of ammunition carried is small.
5. That the vessel is manned by its usual crew, and the officers are the same as those on board before the war was declared.
6. That the vessel intends to and actually does clear for a port lying in its usual trade route, or a port indicating its purpose to continue in the same trade in which it was engaged before the war was declared.
7. That the vessel takes on board fuel and supplies sufficient only to carry it to its port of destination of the same quality substantially which it has been accustomed to take for a voyage before war was declared.

8. That the cargo of the vessel consists of articles of commerce unsuited to the use of a ship-of-war in operations against an enemy.

9. That the vessel carries passengers who are as a whole unfitted to enter the military or naval service of the belligerent whose flag the vessel flies, or of any of its Allies, and particularly if the passenger list includes women and children.

10. That the speed of the ship is slow.

D.—Port authorities, on the arrival in a port of the United States of an armed vessel of belligerent nationality claiming to be a merchant vessel, should immediately investigate and report to Washington on the foregoing indications as to the intended use of the armament in order that it may be determined whether the evidence is sufficient to remove the presumption that the vessel is, and should be treated as, a ship of war. Clearance will not be granted until authorised from Washington, and the master will be so informed upon arrival.

E.—The conversion of a merchant vessel into a ship-of-war is a question of fact, which is to be established by direct or circumstantial evidence of intention to use the vessel as a ship-of-war.

SALUTES AT PANAMA.—Men-of-war visiting Panama Canal zone waters are informed that national salutes will be returned as follows: At the Atlantic entrance by Fort De Lesseps, Manzanillo Point. At the Pacific entrance by a battery on Naos Island or one at Fort Grant barracks, dependent upon the position of the visiting ship when the salute is fired. Vessels which salute from the outer anchorage or before entering the Canal, will be answered by Naos Island; those which salute after having entered the Canal, will in general be answered by Fort Grant.

THE WAR'S INFLUENCE ON SHIPPING AND SHIPBUILDING IN JAPAN.*

At the beginning of the war Japanese trade with Europe was very much disorganised because almost all foreign ships were withdrawn from the service, the regular service having been maintained only by the Nippon Yusen Kaisha. Bills of exchange were impossible to negotiate, and German piracy in Eastern waters threatened navigation. Lately, circumstances have changed in favour of Japanese shipping. Every organ of monetary circulation has been restored, the German fleet in the East was annihilated, and several irregular shipping services were introduced. Moreover, some munitions and food-stuffs began to be supplied from the Far East, so that trade became more active than ever, as the following table shows:—

TOTAL WEIGHT OF CARGO EXPORTED TO EUROPE FROM YOKOHAMA AND KOBE, THE PRINCIPAL PORTS IN JAPAN.

	Cargo in tons.		Percentage increase or decrease.
	1913.	1914.	
October	23,204	8,362	— 68
November	22,656	12,502	— 45
December	22,261	20,417	— 8
	1914.	1915.	
January	18,319	22,274	+ 22
February	19,798	28,547	+ 44
March	19,178	33,391	+ 74

Just before the war broke out, the general aspect of Japanese shipping was very unfavourable. After war was declared, some 200,000 tons of steamers were taken over by the army, most of them having been used for the Tsingtau siege. This created activity in shipping for a little while, but towards the end of the last year, most of the transport ships were released, and general trade still remained inactive, with the result that some ships were obliged to be laid up.

In the meantime, the increased activity of the overseas trade benefited the owners of large ships, and this condition was improved by the shortage of tonnage due to the withdrawal of foreign ships from Eastern waters, so that soon the smaller ships regained their activity. There is reason to believe that the present brisk state will continue so long as the war lasts. In the following table, the fluctuation of the coal rates between Moji and Yokohama (about 600 nautical miles), which is the standard freightage in Japan, is shown:—

FREIGHTAGE PER TON OF COAL BETWEEN MOJI AND YOKOHAMA.

Month.	Beginning of month. yen.	Middle of month. yen.	End of month. yen.
May, 1914	95	90	80
June, "	75	75	75
July, "	75	70	60
August, "	70	100	90
September "	150	125	110
October, "	120	100	80
November, "	70	62	55
December, "	55	50	43
January, 1915	40	43	35
February, "	75	110	100
March "	100	100	125
April "	100	145	150
May "	150	150	150

One yen equals about two shillings.

This table, as well as the fact that the average charter rate per ton deadweight which, just before the war was 1.60 yen or so, rose beyond 5 yen, shows how active the shipping now is.

During and just after two big wars—with China and Russia—Japanese shipping was in a similar state. In the former case, the total tonnage of ships increased about 177 per cent., and in the latter case about 61 per cent. In both cases, excepting the few ships which belonged to protected shipowners who were forced to have them built at home, most of the ships were built or bought abroad. However, during the present war, no ship can be imported;

* Abstract of a paper read by Dr. Imaoka, Chief Surveyor of the Mercantile Marine Bureau of the Department of Communications, at the special summer meetings of the Japanese Society of Naval Architects.

on the contrary, a good many have been sold to the Allies. Under such circumstances, a large series of orders was placed with shipbuilders in Japan in the time below.

Comparing this time with the record output of 53,368 tons of ship steel in 1907, it will be seen that the present order is greater than the capacity of Japanese shipbuilders.

Shipbuilders who got these orders were faced with a serious difficulty. Even in times of peace, steel manufacturing in Japan is suffering from being self-supporting. The Government steel works at Edamitsu produce yearly 200,000 tons; of this ship steel is only 50,000 tons, the main part of which is supplied for the use of the navy, only a few thousand tons being used for merchant ship building. Therefore, up to the present time, practically the whole of ship steel has been imported from Great Britain, with only a small percentage from Belgium and Germany.

Since the war, the price of ship steel has become about 30 per cent. dearer; the market price on May 13 was:—British steel, 121 41 yen; American steel, 133 94 yen; is against between

NEW JAPANESE CARGO STEAMSHIP FOR THE EUROPEAN SERVICE.

The photographs on page 209 illustrate the twin-screw steamship *Toyooka Maru*, built and engined by the Mitsu Bishi Dockyard & Engine Works, Nagasaki, for the European service of the Nippon Yusen Kaisha. Classed 100 A1, at Lloyd's, this steamer has a length between perpendiculars of 445 ft., a breadth (moulded) of 35 ft., a depth (moulded) of 34 ft., and a gross registered tonnage of 7,386 tons. The propelling machinery comprises two sets of Parsons geared turbines with Contraflo condensing plant, and there are four cylindrical single-ended boilers. The total indicated horsepower is 6,420, and the speed on trials was 14.506 knots; the service speed, loaded on a draught of about 27½ ft., is, we believe, about 11½ knots. The vessel was launched on March 20 last, she proceeded on her trial trip on May 22, was delivered to her owners on June 3, and is at present in the Royal Victoria Dock, London.

This is the second of this class to have geared turbines, the other being the *Toyooka Maru*, which arrived in the Thames earlier in the

NUMBER AND TONNAGE OF MERCHANT SHIPS ABOVE 100 TONS, BEING BUILT AND NEWLY ORDERED IN JAPAN.

	Mitsui Bishi Dockyard, Nagasaki		Kawasaki Shipyard, Kobe		Osaka Iron Works, Osaka		Mitsui Bishi Dockyard, Kobe		Yokohama Dockyard Co., Yokohama		Furukawa Shipyard, Yokohama		Harima Shipbuilding Co., Harima		Total.	
	No.	Gross Tonnage	No.	Gross Tonnage	No.	Gross Tonnage	No.	Gross Tonnage	No.	Gross Tonnage	No.	Gross Tonnage	No.	Gross Tonnage	No.	Gross Tonnage
British	1	7,300	2	7,300	1	4,000	—	—	—	—	—	—	—	—	—	—
Belgian	1	9,600	1	9,600	1	2,600	—	—	—	—	—	—	—	—	—	—
German	—	—	1	2,600	—	—	—	—	—	—	—	—	—	—	—	—
Japanese	2	1,000	4	2,800	2	9,000	—	—	—	—	—	—	—	—	8	50,300
Other	1	7,000	1	1,700	12	12,000	1	1,800	5	2,200	1	2,000	2	1,100	—	—
New Zealand	—	—	3	7,300	1	7,000	2	5,300	—	—	—	—	—	—	—	—
Other	—	—	1	3,000	1	1,100	—	—	—	—	—	—	—	—	—	—
Other	—	—	2	1,100	6	7,000	—	—	—	—	—	—	—	—	—	—
Other	—	—	7	7,100	20	88,000	—	12,000	5	11,000	1	2,000	2	2,200	44	187,900
Other	—	—	11	6,200	12	94,000	—	12,400	5	11,000	1	2,000	2	2,200	52	238,200

85 to 90 yen before the war. Moreover, delivery has become much delayed and even uncertain. Even under such unfavourable circumstances nearly 80 per cent. of ship steel was ordered from British and American steel makers, only the remaining 20 per cent. being obtained from the Japanese makers already alluded to.

The manufacturing of fittings and equipments, such as deck machinery, ropes, chains, pumps, nautical instruments, &c., has of late been very much improved. However, like steel, it still requires foreign assistance.

Under such circumstances the price of shipbuilding has become very dear, as is shown in the following table:—

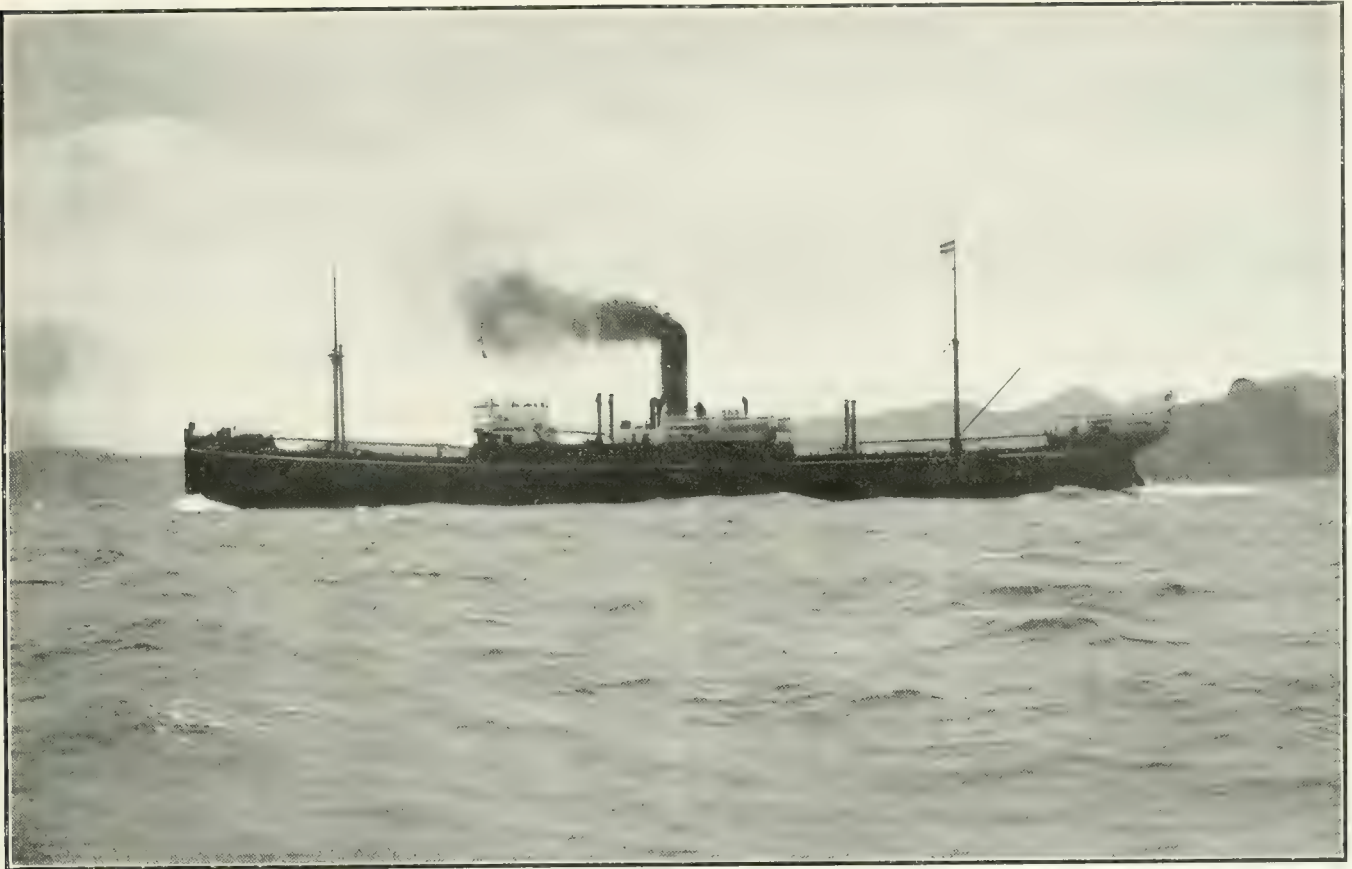
AVERAGE PRICE PER GROSS TON OF TRAMP SHIPS.

Gross tonnage.	Price before the war.	Price after the war.	Latest estimate.
1,000 tons	145 yen.	175 yen.	190 yen.
2,000 "	130 "	150 "	160 "
3,000 "	120 "	140 "	150 "
5,000 "	145 "	170 "	180 "
6,000 "	140 "	160 "	170 "

NEW B.I. SERVICE, SINGAPORE-BANGKOK. It is announced that a new service has been instituted by the British India Steam Navigation Company between Singapore and Bangkok of vessels especially adapted by their capacity, speed and passenger accommodation to the trade. The service is a fortnightly one and was inaugurated on July 5 last. It is expected that arrivals and departures will, when normal arrangements are resumed, be made to correspond at Singapore with the homeward and outward P. & O. mail steamers respectively, thus constituting a direct and expeditious service, both ways, between Europe and the Siamese capital.

year, followed by the *Toyohashi Maru*. The latter, however, has twin-screw triple-expansion engines and superheaters. There is another vessel constructing similar to these, and this will also have twin-screw geared turbines.

FAR EASTERN TRADE.—In Far Eastern waters there is increasing evidence of shipping activity, and, indeed, but for the regrettable shortage of tonnage, more than "a certain liveliness" would have been evident there long before this. Competition between the British and Japanese companies is becoming keener, but except on the Kobe-Calcutta route, where an agreement seems more remote than ever, it is not, we believe, on the whole, unfriendly. The latter, of course, enjoy the advantage of temporarily having more vessels available for service, and, in this connection, their extensive buying a few years ago of second-hand ships has proved to be a profitable investment. Along the China coast they are, however, finding it difficult to trade in consequence of the Chinese boycott, as a result of which it is highly improbable that the Nippon Yusen Kaisha will be able to acquire control of the China Merchants' Steam Navigation Company, which would give it a stronger hold on the trade of the Yangtze, greatly to the detriment of British interests. As we announced last week, the Osaka Shosen Kaisha is preparing to establish a regular European service, while on the Pacific a Chinese syndicate, in conjunction, we hear, with Mr. Robert Dollar, the outspoken critic of American shipping legislation, is about to run vessels between Hong-Kong and the ports on the western seaboard of North America. British enterprise is by no means, however, quiescent, notwithstanding the tonnage handicap. The inauguration of sailings by the British India Company between Singapore and Bangkok, and the acquisition by Alfred Holt & Co., of the Indra Line, whose vessels run on the New York-Far East route, show that developments are taking place.



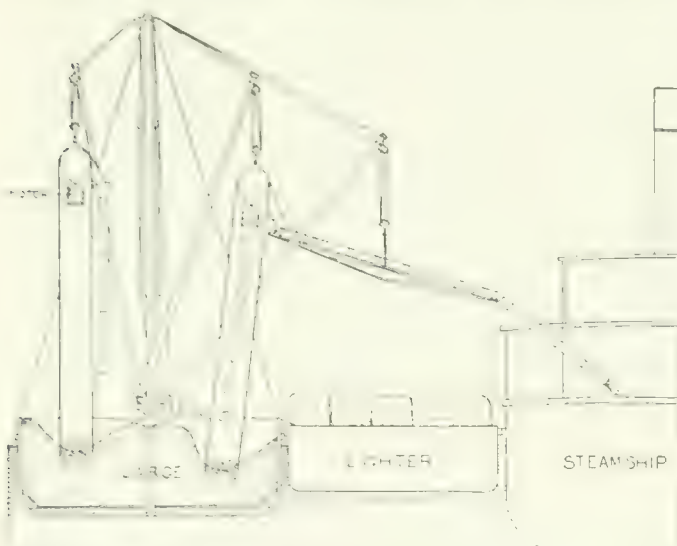
TSS. "Toyama Maru." Built and Engined by the Mitsu Bishi Dockyard and Engine Works, Nagasaki, for the European Service of the Nippon Yusen Kaisha.



Launch of the Twin-Screw Geared Turbine Cargo Steamer, "Toyama Maru," at Nagasaki. (See page 208.)

INCREASED BUNKERING FACILITIES AT PANAMA.

The difficulties of coaling vessels promptly at Cristobal, which have been experienced as the result of the increasing demands of vessels and the non-completion of the permanent coaling plants, have been lessened by the use, in addition to the previous facilities, of four motor-driven conveyors, or hoisters, which are used to discharge coal from barges and lighters alongside vessels into their bunkers. In *The Canal Record* particulars are given of these two 500-ton barges having been fitted for this service, each with two conveyors. The conveyors are of the De Mayo make and consist essentially of an endless chain of scoops, operating in a vertical steel casing about 25 ft. high, from the top of which the material being handled is discharged into a pipe chute, passing by gravity to its destination. The elevators are suspended by cables from booms.



De Mayo Elevators Suspended from Booms.

They have ingeniously worked the means adopted to coal steamships from a coal barge alongside the vessel. Here the elevator delivers to a belt conveyor mounted on a rotating frame and attached to the discharge spout. This conveyor is of sufficient length to deliver coal over the lighter to deck hatches, thus allowing the lighters to be facing a barge from both sides.

This regulates their elevation while they dig into the coal by their own weight and allows their being swung about to reach any point in the hold of the barge.

The first use of this new equipment on commercial vessels was in the coaling of the steamship *Finland* of the Panama Pacific Line, which passed through the Canal on her way from New York to San Francisco on June 24. On the second vessel coaled, the *Guatemala*, of the Pacific Steam Navigation Company, the rate of supply was 26½ tons per hour. This is regarded as low for this equipment, and it is expected that when the operators shall have become thoroughly trained to their work each barge will supply approximately 60 tons per hour. If such effectiveness be attained the facilities for bunkering at Cristobal will have been practically quadrupled.

In the meantime, work is being pushed on the permanent coaling plant for the Atlantic entrance as rapidly as the material is supplied by the contractors. It is planned to complete two of the four unloader towers this month, and, by a modification of their construction, use them for both unloading colliers and loading into customer vessels from the stock pile. This is a temporary expedient, for use only until the regular reloader towers shall be completed, but as the two towers command a considerable storage space and each will be capable of handling about 250 tons an hour, it will in all

probability meet the situation quite satisfactorily until the completed plant is in service.

All four of the towers for the plant have been erected, but the two toward the outer end of the wharf are those on which early completion is being pushed. The two stocking and reclaiming bridges have been practically completed with respect to the structural work, but the machinery is yet to be installed. They will probably be completed by the end of this month. The material for the reloader towers arrived from the United States and their erection is being proceeded with. The viaduct commanding the dry storage space is about 50 per cent. completed. The dredging alongside the wharves has advanced sufficiently to allow vessels access to the plant whenever desired.

At the Pacific plant, one of the two unloader towers is practically erected, and all four of the berm cranes, which will be used for stocking and reclaiming, have been erected. Work has not begun on the two reloaders, the wharf for which is yet to be built; the sinking of caissons for this wharf is in progress. This construction is intimately related to that of the dry dock, as the coaling plant will form one side of the entrance slip to the dry dock, and the work is held back somewhat by the needs of the dry dock construction. For instance, connecting the unloader wharf with the reloader wharf will require excavating through the cofferdam protecting the dry dock excavation, and this adds to the difficulty of the work. The preponderance of bunkering at the Atlantic end is such—on account of the prices being \$1 less per ton there—that the present commercial demand for a coaling plant at the Pacific entrance is slight.

For the further extension of the coaling facilities at the Canal four more motor-driven conveyors, similar to the four now in service, are on the way to the Isthmus from the United States, and a project has been approved by which several berths at the commercial piers at each terminus will be fitted with booms for using the conveyors in unloading cars into ships' bunkers. The four conveyors now in service are used on barges, and bunker vessels at dock from the off-shore side, and the new equipment will make it practicable to bunker vessels from both sides while they are discharging cargo. It is proposed to install two conveyors on both sides of Pier 8 at Cristobal, two on the front of wharf No. 9, and two on each side of Pier 7 when constructed. They will unload from a special type of car, consisting of a Lidgerwood flat car built up with 5-ft. sides and ends, forming a compartment 38 ft. long which will hold from 45 to 50 tons of coal.

REGISTERED DESIGNS AND WAR WORK.

The following amendment has been made under the Defence of the Realm Act:—

1. After Regulation 8B the following Regulation shall be inserted:

" 8c. It shall be lawful for the Admiralty, Army Council or Minister of Munitions to authorise or require any contractor holding a contract with the Admiralty, Army Council or Minister of Munitions or any sub-contractor, to use any registered design for the purposes of such contract, and thereupon the contractor or sub-contractor shall be entitled for the purposes aforesaid to use the registered design and to apply the same to any article in any class of goods in which the design is registered without the consent of the registered proprietor, and the consideration to be paid for the use of the registered design shall, in default of agreement between the proprietor of the design and the Admiralty, Army Council or Minister of Munitions, as the case may be, be determined, at the option of the Treasury, either in the manner in which other claims for compensation under these regulations are determined, or in the manner in which the consideration for the use of a patent is determined under section 29 of the Patents and Designs Act, 1907."

NEW STEAMER FOR THE AUSTRALIAN STEAMSHIPS, LTD.

On August 30, John Priestman & Co., Sunderland, launched the ss. *Kowarra* for the Australian Steamships, Ltd. (Howard Smith, Ltd., Melbourne, Managing Agents).

The vessel is of the following moulded dimensions:—

Length	270 ft.
Breadth	39 ft. 9 in.
Depth	20 ft.

The deadweight capacity is 2,800 tons, on a draught of 18 ft. 3 in., and the vessel is fitted with modern appliances for the rapid handling of cargo, having 9 horizontal winches working in conjunction with 8 steel tube derricks and 4 gaffs.

PORT OF LONDON WORKS AND IMPROVEMENTS.

In the report of the Port of London Authority to which reference was made in a recent issue, details of the works and improvements in hand are given. The account shows that as regards the London Docks the re-building of the eastern and western passage of the tobacco dock—60 ft. wide and 25½ ft. deep—has been completed. The new ferro concrete jetty—782 ft. long by 192 ft. wide—with two double-storey transit sheds in the western dock, has been handed over to the Authority by the contractors, and has been of great service in the last few months in diminishing congestion. New cranes are in course of erection. The pumping station to maintain the water level at 4½ ft. above Trinity high-water is finished and now in use.



Launch of the "Kowarra" at Sunderland. Built by John Priestman & Co. and engined by George Clark, Ltd., for the Australian Steamships, Ltd.

The vessel is of the raised quarter-deck type with poop bridge and forecastle, no pillars being fitted in cargo spaces. The water ballast capacity is 746 tons.

Accommodation for captain, officers and engineers is provided on and under the bridge deck, the sailors being berthed in the fore-castle and the firemen in the poop.

The electrical installation includes hold lamps, cargo clusters and arc lamps.

The vessel will be fitted with machinery by George Clark, Ltd., Sunderland, consisting of triple-expansion engines having cylinders 20½, 33½, 55 in. by 39-in. stroke, and two single-ended boilers 15 ft. in diam. by 10 ft. 6 in. long, 180 lb. working pressure, designed for the consumption of inferior coal, to give a sea speed loaded of 10½ knots.

The *Kowarra* is classed 100 A1 with Lloyd's Registry, and has been constructed under the supervision of Mr. W. E. Forster, assisted by Mr. J. K. Ramsay.

The widening of the entrance passage at the East India Docks between the basin and the import dock to 80 ft. wide by 31 ft. deep is approaching completion. The lock gates and swing bridge have been erected and the foundations for the operating machinery are in hand. The false quays on the north and east of the import dock are in a forward state of construction. Three transit sheds—each 400 ft. by 110 ft.—on the north quay of the import dock, and the double-storey shed—420 ft. by 50 ft.—on the east quay of the import dock and the pumping station are finished.

At the West India Docks, of a total length of 2,451 ft. of the north quay widening, import dock, 2,146 ft. have been completed. Two of the three double-storey transit sheds—each 800 ft. long by 65 ft. wide—are finished and in use, and the remaining one is well in hand.

With regard to the works under construction at the Royal Albert Dock extension (south) the Authority has decided to lengthen the dry dock from 650 ft. to 750 ft., and to increase the depth of the

... and 3 ft. to 35 ft. to 38 ft. below in ponded water level. For the entrance to the dock—the dimensions of which are 800 ft. long by 100 ft. wide by 45 ft. deep below Trinity highwater—about 800 ft. of wall on the north side and 650 ft. of wall on the south side, have been built to within 6½ ft. of the coping level. Of the main dock excavation, approximately 9,885 lineal ft. depth 38 ft. to about 2,400,000 cubic yards of material have been removed of an estimated total of 3,300,000 cubic yards. The south quay for its entire length has been practically finished and about 670 lineal ft. of the north quay wall is nearing completion. Trench excavations for the north wall of the dry dock have been made for a length of 580 ft., and a length of 230 ft. of concrete walling is in progress. Progress has also been made with the passage connecting the new and old docks. A commencement has been made with the foundations for the westernmost shed on the south side of the dock. The lock gates, caisson, and bascule and swing bridges are on order with Sir William Arrol & Co., Ltd., of Glasgow.

The monolith foundations for the new dock wall at Tilbury Docks have been sunk, and the south quay extension is well in hand. The total length is 1,612 ft., of which 400 ft. have been constructed to nearly full height. Of 1,100,000 cubic yards of excavation one-third has been removed. Three transit sheds—550 ft., 600 ft., and 650 ft. long respectively by 120 ft. wide—are under construction. One has been brought into use for a length of about 450 ft.

The reinforced concrete piles and cylinder sections required for the riverside jetty at Tilbury have been moulded, and 57 out of a total of 194 cylinders have been lowered to the full depth. The framework at the eastern end of the jetty has been completed for a length of 250 ft.

Progress has been made with the new cold store for 250,000 carcasses of sheep on the north side of the Royal Albert Dock. The whole of the reinforced concrete framework has been completed up to the underside of the fifth, or distributing floor, and the internal and external brickwork is in hand. Of the two-storey shed on the quay front—1,100 ft. long and 120 ft. wide—325 ft. have been completed so as to be used for general cargo on the ground floor. It is intended that the upper floor shall be used for sorting carcasses in cold atmosphere after their discharge from vessels, and it has been decided to convert a portion of this floor into cold chambers, the whole floor being capable of taking a further 250,000 carcasses, thus making a total capacity for 500,000 carcasses.

In expansion of the Authority's dredging scheme of a navigation channel 30 ft. deep from the Nore, 1,000 ft. wide to Crayfordness, and 600 ft. thence to the Royal Albert Dock, it has been decided to dredge this channel to the full width of 1,000 ft. to a point a mile above Crayfordness. This improvement will considerably facilitate navigation at this bend of the river. The work of dredging the docks and river has been interfered with by the war. The bucket dredgers, hoppers, and their crews, have from time to time been engaged in carrying out work for the Government. The total of the year's output on the Authority's account has been 835,144 cubic yards from the docks, and 2,698,837 cubic yards from the river.

Thirty-five sunken vessels were removed from the river by the Authority's wreck-raising plant during the year. Of these six were steam vessels measuring 4,581 tons in the aggregate, 27 were sailing vessels and barges measuring 4,072 tons in the aggregate, and two were steam dredgers. In addition, two steamers measuring 3,681 tons and 16 sailing vessels and barges measuring 1,437 gross tons, were raised in the docks.

As the demand for storage space at the docks of London is still unsatisfied, the Port of London Authority have decided immediately to put in hand considerable further accommodation. Additional sheds of an area of 48,600 sq. ft. are to be provided at Millwall Dock, where another 108,600 sq. ft. of shedding was recently completed. At the Royal Victoria Dock it has been arranged to re-erect a shed with an area of 49,000 sq. ft. which formerly occupied the site of the new cold-storage sorting shed at the Royal Albert Dock.

In order to deal with the abnormal conditions created by the war, the Port Authority had previously undertaken an expansion of storage accommodation representing a total area of about 400,000 sq. ft. The further works now decided upon will increase this figure to nearly 500,000 sq. ft. In other words, between 10 and 11 acres of additional shed accommodation will be at the service of the port.

DUTCH MARINE ACCIDENT INSURANCE.

There has recently been enforced a Dutch law regarding marine accident insurance, brought about primarily by war losses, but almost certain to remain in force after the war, though possibly in a modified form. When a scheme for general accident insurance was introduced in 1901, shipping and fisheries were excluded owing to the special conditions appertaining to these services. A later attempt to provide marine accident insurance failed chiefly owing to Government opposition, and in the meantime a number of owners, chiefly the larger ones, insured their employees in private companies. Mutual insurance companies did much good work, particularly in the fisheries, but pensions were seldom available for victims or their dependants, benefits being limited to single relatively small payments.

The new law applies only to accidents attributable to the war, but it is felt by all parties concerned that a scheme of general and permanent marine accident insurance will follow from it. The onus of insurance is placed upon owners who may insure with private companies or with the State or deposit an appropriate sum from which to pay claims themselves. An annual pension is provided for the dependants of seamen losing their lives due to the war or losing them by any unknown cause within the war zone. Risks are divided into two classes: (1) Seamen with children under 16 years of age; (2) other seamen; and into sub-sections according to the class and size of ship: (a) Sailing vessels and steamers of less than 1,000 tons gross; (b) steamers of 1,000 to 3,000 tons; (c) steamers of 3,000 tons or more. Insurance may be for one voyage or more, with repayments on early arrivals and extra payments for delayed passage. Premiums per voyage are as follows, for Class 1 insurances, in thousandths of daily wage:—

To or From	Class 1. (a)	Vessel. (b)	Group. (c)
London	7.2	4.16	2.72
South Coast, England; East Coast, France; Mediterranean; Dutch Indies; America	10.72	6.24	4.00
Denmark, Gothenburg, Christiania, Stockholm	21.44	19.48	8.00
Other Baltic ports	36.04	20.96	13.44

The premiums in Class 2 are approximately 27, 38 and 52 per cent. of the above amounts for vessels in groups (a), (b) and (c) respectively. Fishing boats form a special class, the premiums being 13.92 for Class 1 and 3.68 for Class 2. The pension payable is 75 times the daily wage for officers or merchantmen, 50 times for engineers, and 40 times for others. On power trawlers and sailing vessels over 40 tons, the master's pension is 50 and that of the others 40 times the daily wage. Dependants of men on smaller vessels are eligible for a pension of 30 times the daily wage. The daily wage is taken to be the annual wage divided by 309.

The State pays half the premium in the case of trawlers, because the work is intermittent and hazardous, and owners cannot pass any of the cost of insurance on to consumers. Efforts are being made, apparently with prospect of success, to persuade the State to pay 75 per cent. of the premium on trawler insurance.

NEW SERVICE FROM AMSTERDAM TO CALLAO AND VALPARAISO. — His Majesty's Consul-General at Rotterdam reports that the "Koninklijke Nederlandsche Stoomboot Maatschappij" has published a notice to the effect that a regular monthly service between Amsterdam and Callao and Valparaiso, via the Panama Canal, was inaugurated on August 31 by the ss. *Pullux*. This line will carry goods for ports on the west coast of South America generally.

GENERAL NEWS SECTION.

PERSONAL.

Mr. Walter Holland, of Lamport & Holt, Liverpool, who died on May 8, aged 72, left estate of the gross value of £201,511, with net personality of £148,397.

A commission in the R.A.M.C. has been granted to Mr. Robert Rankin, son of Mr. John Rankin, of Rankin, Gilmour & Co., Ship-owners, Liverpool. Lieut. Rankin is a director of the firm and has been serving with the Public Schools Corps.

Brook & Vincent, of 34, St. Mary Axe, London, cargo superintendents, have converted their business into a private limited company, under the same title with the addition of the word limited. Mr P. V. Brook and Mr. F. W. Vincent are joint managing directors.

Mr. Charles E. Plummer, R.D., R.N.R., Deputy-Superintendent of the Mercantile Marine Office at Hull, has been appointed Superintendent of the Board of Trade Mercantile Marine Office at Newcastle. Mr. Plummer, who succeeds the late Mr. Nicholas Fitzgerald, has been at the Hull office since 1883.

In addition to Herr Ballin, of the Hamburg-Amerika Line, Herr Heineken, of the Norddeutscher Lloyd, and Herr Amsink, of the Hamburg-South American Line, have received the Iron Cross, in recognition of "their meritorious co-operation in the preparation and despatch of munitions for the Imperial Navy."

At Newcastle, last week, Lord Joicey presented Second-Lieutenant Nesbitt, R.G.A., and Gunners Gowans, Balmer, McCabe and Robson each with a gold medal and certificate from the Queen of Holland, in recognition of their services in saving the crew of 20 men of the Dutch steamer *Shiedrecht*, which was wrecked off South Shields on March 18.

Captain Archibald McCorquodale, of the Belfast & County Down Railway Company's steamer *Erin's Isle*, was taken ill on the bridge on September 2, and died next day. He was 21 years in command of the company's steamers prior to which he was in the service of the Liverpool & North Wales Steam Packet Company. The interment took place at Crarae, Argyllshire, of which deceased was a native.

The death has occurred at Erith, Kent, of Captain E. W. Owens, Secretary of the Local Marine Board, London, and Chief Examiner of Masters and Mates. Mr. Owens, who was in his 62nd year, was a Fellow of the Royal Astronomical Society, and among the books he wrote one of the best known is "How to Learn Ashore the Rule of the Road." He received the Albert Medal for a gallant rescue when rounding Cape Horn.

Mr. W. Redfern Kelly, M.Inst.C.E., retired from the post of Consulting Engineer to the Belfast Harbour Commissioners on August 31, after a year's service in that capacity following on his retirement as Engineer-in-Chief of the Trust. Mr. Kelly is at present sojourning in Newcastle, and is in excellent health. He has been granted an annual allowance of £800 per annum, and in his letter of thanks states that his information as to the port will always be at the disposal of the Commissioners.

Captain John Miller, 6th Battalion Royal Welsh Fusiliers, who has been killed at the Dardanelles, was the Secretary of the Engineering and Scientific Association of Ireland. He received his early training at Cammell Laird's, Birkenhead, where he was chiefly engaged on torpedo boat and destroyer construction. Since

1900 he had been on the engineering staff of Guinness' Brewery, Dublin. He was the eldest son of Mr. J. J. Miller, Dalestorth House, Mansfield, and was a prominent vocalist and Freemason and an enthusiastic Territorial.

Captain Edward Holland Hills, R.N. (84), of Littlehampton, who sailed with the *Phoenix* in Inglefield's Arctic Expedition and served with the *Royal George* during the Crimean War and in the Chinese War, left £7,010.

A Central News message from Amsterdam says that Herr Richard Peltzer, who as a member of the Board of Directors of the Woermann Line for seven years represented the interests of that line, and of the Hamburg-Amerika and Hamburg-Bremer Afrika Line at Antwerp, will act from January 1 as director of the Hamburg-Amerika Line.

We regret to learn of the death, which took place at Melrose on Thursday of last week, of Mr. George W. Manuel. Mr. Manuel was born in Edinburgh in 1834. He began his engineering apprenticeship with Mr. Bathgate, Selkirk, but later transferred his services to John Elder & Co., Govan. After being with the P. & O. Company for some years he left, in 1876, to take up an appointment under Lloyd's Registry of Shipping. Subsequently he returned to the P. & O. Company on being offered the appointment of superintendent engineer, and continued in the service in London till about 10 years ago, when he retired. He rendered valuable services to the Admiralty, and was made an Honorary Chief Engineer of the Royal Naval Reserve.

GLASGOW SHIPYARD STRIKERS.

£10 FINES IMPOSED.

Twenty-six shipwrights who came out on strike from the shipyard of the Fairfield Company, Glasgow, appeared before a Special Munitions Tribunal, held in Glasgow on Friday. The Court differed from those held formerly in that the prosecutions were at the instance of the Minister of Munitions and not of the employers. The Tribunal was presided over by Sheriff Fyfe, and Mr. Robert Baird of the Coalowners' Association, and Mr. Sam Bunton of the Amalgamated Society of Engineers, acted as assessors.

The indictment against the men was to the effect that on August 26, while in the employment of the Fairfield Shipbuilding & Engineering Company, Govan, they did leave their employment and take part in a strike and that they had been on strike each working day since, in contravention of the Munitions of War Act.

Mr. George Strachan, Director and Secretary of the Fairfield Company, who appeared as a witness, said the company were wholly engaged on work for the Admiralty, and that their yard was a controlled establishment. On August 26 about 426 shipwrights in their employment went on strike, and the result had been the serious retarding of work.

A foreman shipwright, who also gave evidence, said the dispute arose in consequence of the dismissal of two men by him. After the dismissal two of the shop stewards came to him and asked him to have the men taken back, stating at the same time that they objected to the words he had put on the men's lines. He told them he could not take the men back, and that afternoon over 300 men left their work and went on strike. New discharge notes were made out, with the words—"not attending to their work"—which were objected to, deleted, but these notes were refused by the shop stewards, and the shipwrights declined to return to work till the two dismissed men were reinstated. Evidence was given by an assistant manager to the effect that the two men, along with

others were found making and mending on board a ship in course of construction, when they should have been working.

The Court found the charge proved against 17 of the men, and in the other nine cases the charge was dropped.

Sheriff Eyre, in finding the accused guilty, said that reasons for going to Elswick and other munition factories on Tyneside. There has recently been a little discontent on the part of these men as to their terms of employment, and they have alleged there has been some misapprehension. Although the men are receiving the standard rates of wages ruling in their particular branch of trade, they state it does not permit of their maintaining themselves here and a home in Canada. The conciliatory manner in which they placed their case before the employers must surely have been a lesson to many of our own men. These Canadians averred from the outset they would proceed in a constitutional manner; they made no charge of bad faith against any of the labour recruiting officers, but as men drawn temporarily from one area in this country to another are allowed lodging expenses whilst employed away from their own homes, they considered the allowance (2s. 6d. daily) might be made in their case. A conference was held here last week between representatives of the imported Canadian labour and a representative from the Labour Department of the Board of Trade, and it is understood that the suggestion made by the men is to be adopted.

The men who were on strike have since returned to work.

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(FROM OUR OWN CORRESPONDENT.)

Glasgow.

Generally speaking shipbuilders on the Clyde are much too busy turning out work of various kinds to have much time left for extending their premises. There are, however, a few firms who have been obliged to make extensions, and among these is Scott's Company, Greenock. The latest addition which this firm are to make is a small two-storey building which they are to erect in their East Yard. The building will be used as foremen's offices. At Port Glasgow good progress is being made with the erection of the new workshops and offices at the yard of Ferguson Bros., while improvements have also recently been made on the premises of Dunlop, Bremner & Co.

STEEL FROM JAPAN.

All departments of the Scottish steel trade are fully employed, and while there is considerable pressure for the delivery of Government orders, there has also been more inquiry for shipbuilding material. During the past week or two plate mills have been busier, probably as a result of the placing of the orders for several oil-carrying steamers with certain Clyde firms. Ship plates are quoted at £10 5s. and upwards for export or home, and boiler plates at about 10s. more. Heavy shipments of steel continue to come in from the United States, and it is interesting to note that recently a consignment of steel was landed here from Japan. July is the latest month for which figures are yet available, and during that month 3,621 tons of steel, valued at £28,801, were landed at Scottish ports from the States, and about 35 tons from the Netherlands.

FIRTH OF FORTH TRADE.

After more than a year of war, the trade of Scottish ports is settling down on more or less well-defined lines. While the ports on the River and Firth of Clyde are enjoying a period of uninterrupted prosperity, those on the Forth, with the single exception of Leith, are not in a satisfactory condition. The import trade of Leith has been pretty well maintained, though exports have fallen off to a considerable extent. At Burntisland, Methil and other places, however, trade has been very seriously affected as a result of the war, and numbers of workers have left these places in order to secure employment elsewhere. The greatest falling-off has been in the exports of coal.

THE NORTH-EAST COAST.

(FROM OUR OWN CORRESPONDENT.)

Newcastle-on-Tyne.

There is little change in the shipbuilding position and purely commercial tonnage is of insignificant proportions. Ship-repairing is rather quieter than during recent weeks, as during the past few days some of the Tyne graving docks have been empty. There are, however, a few more than ordinarily important repair jobs on hand, and a fair amount of Government work. Material shows little alteration and past quotations rule. The arrangement just recently made by the Government with the English and Scottish Steelmakers' Association for the State regulation of the price and distribution of steel has had a good effect.

MUNITION WORKERS' GRIEVANCE.

As previously mentioned in this column, several hundred skilled mechanics drawn from all parts of Canada—but principally from the western side of the Dominion—are now working

at Elswick and other munition factories on Tyneside. There has recently been a little discontent on the part of these men as to their terms of employment, and they have alleged there has been some misapprehension. Although the men are receiving the standard rates of wages ruling in their particular branch of trade, they state it does not permit of their maintaining themselves here and a home in Canada. The conciliatory manner in which they placed their case before the employers must surely have been a lesson to many of our own men. These Canadians averred from the outset they would proceed in a constitutional manner; they made no charge of bad faith against any of the labour recruiting officers, but as men drawn temporarily from one area in this country to another are allowed lodging expenses whilst employed away from their own homes, they considered the allowance (2s. 6d. daily) might be made in their case. A conference was held here last week between representatives of the imported Canadian labour and a representative from the Labour Department of the Board of Trade, and it is understood that the suggestion made by the men is to be adopted.

MERSEY SHIPPING AND SHIPBUILDING.

(FROM OUR OWN CORRESPONDENT.)

Liverpool.

The first sitting of the Local Munitions Tribunal at Liverpool on Saturday, gives point to a circular appeal which has been issued by the Mersey District Committee of the Federation of Engineering and Shipbuilding Trades on the question of slacking in the Merseyside workshops. What has prompted the Committee in issuing this circular is that their investigation into complaints made by the masters has proved that among certain sections of workers habitual broken time prevails to a very serious extent, in extreme cases amounting to as many as four days in one week.

MUNITIONS COURT.

The several cases heard at the Munitions Court on Saturday were in respect of an organised effort made by several workers at Cammell Laird's refusing to work overtime in order to obtain consideration of an alleged grievance as to the rate of wages being paid under sub-let contracts in the district. These men had acted on the instructions of their Society's officials, and to the charge brought against them they could only offer the plea of guilty. The Court imposed a penalty of 20s. against each of them.

Mr. Thomas M. Newell, the Engineer-in-Chief of the Mersey Docks and Harbour Board gives some interesting figures in his annual report, just issued, on the vast dredging operations that are constantly being carried on to maintain the bar and channel approaches to the port at a safe navigable depth for the deep draughted Atlantic liners. The quantity of sand removed from the bar and shoals in the Queen's and Crosby Channels during the year ending July 1 last was 14,619,140 tons. The quantity removed since the commencement of dredging there in 1890 has reached the huge total of 234,752,310 tons.

A NEW SERVICE.

Another new Manchester service to Nantes and Bordeaux is announced by J. Leete & Son, the Manchester agents of the Hudson Bay Line of steamers. The sailings will be every 10 days from the terminal ports.

SOUTH WALES NOTES.

(FROM OUR OWN CORRESPONDENT.)

Cardiff.

Ship-repairing firms, as a whole, are not quite so actively engaged as they have been for some time past. However, work is fairly plentiful and evenly distributed, and most docks have sufficient to keep them going. For the most part the repairs in hand consist of surveying and overhauling jobs; most of the heavy damage jobs, of which there has been an exceptional number of late, having been completed. The Bute Shipbuilding & Engineering Company, Ltd., continue to be briskly employed with extensive bottom repairs to the auxiliary steamer *Neath*, while the Cardiff Channel Dry Docks & Pontoon Company, Ltd., are renewing about 17 bottom plates on the French steamer *Berthe*, and carrying out general repairs to the steamers *Nurtureton* and *Augoustis*. Hills' Dry Docks & Engineering Company, Ltd., are still busy with heavy bottom repairs and an internal overhaul of the steamer *Woodbridge*, and general work to the barque *Chacma*. The Cardiff

Junction Dry Docks & Engineering Company are carrying out rather extensive internal repairs to the steamer *Hornarth*, while the Mercantile Pontoon Company are effecting general repairs to the steamer *Sifnos*. The Mountstuart Dry Docks, Ltd., are busy with heavy engine work on the steamers *Liege* and *Mercator*, and general repairs to the steamers *British Transport*, *Pacific* and *Charleston*, while Elliot & Jeffrey are putting the steamers *Castro* and *Antigone* through survey and T. Diamond & Co. are renewing a number of furnaces on board the steamer *Tjomo*. The Barry Graving Docks & Engineering Company, Ltd., are fitting about 12 bow plates and a stem bar on the steamer *Glenspean*, and a few shell plates on the steamer *Runswick*. They are also placing a new rudder and carrying out extensive engine repairs on the steamer *Beemah*, besides heavy bottom work on the steamer *La Fontaine*. The fitting of a very large number of bottom plates and general repairs to the steamer *Palestrina*, which has been purchased by Plisson & Co., Paris and Cardiff, has just been completed at Barry. C. H. Bailey have a big stem damage job on the steamer *Agenoria*, which was in collision with an iceberg and crushed her bows back very badly so that plates extending back to the No. 1 hold were damaged. The repairs necessary include a new stem bar, a large number of frames and floors and about 40 plates. A number of plates and frames have to be straightened or renewed on the steamer *Monkstone*, which also has been in collision, while grounding damage to the steamer *Crown* is also being repaired by C. H. Bailey at Barry. Repairing work at Swansea was somewhat quieter during the past week, but at Newport active conditions continued in evidence, the Channel Dry Docks Company having the *Glensloy* and *Corso* in hand for general repairs, while Mordey, Carney & Co. had the steamers *Framfield* and *Armonia* in dry dock. John Shearman & Co. were engaged in repairing 29 steamers at Cardiff, Barry and Newport. General repairs constituted the bulk of the repairs though the steamer *Figaro* was having bottom damage attended to.

NEAR EASTERN SHIPPING NEWS.

(FROM OUR OWN CORRESPONDENT.)

Port Said.

The Government of Egypt has issued certain regulations with regard to sailing vessels. All such vessels sailing in the Suez Canal, entering or leaving the Egyptian waters of the Mediterranean, the Gulf of Suez and the Red Sea, as also the inland lakes of Egypt, must affix to their exteriors two plates, one on each side, bearing their numbers in large figures. Every sailing vessel must also have the number painted in large letters on the main sail, and must obtain a permit either for navigation or fishing from the Coastguard Administration. These regulations are largely the result of attempts by Greek-owned vessels to run the blockade of the Turkish coasts of Syria and Asia Minor with contraband from Egypt.

The Khedivial Mail Line, in view of recent happenings, is arranging to discharge practically all the sailors of Greek nationality which it employs. A start has been made with the crews of the steamers *Kahira* and *Prince Abbas* from which some 47 Greeks and Cretans have been dismissed.

AUSTRIAN-LLOYD OFFICES CLOSED.

The Austrian-Lloyd Steamship Company's offices in Alexandria have been closed. When war broke out many residents of Egypt who were in Europe had already paid for return tickets by this line, but owing to hostilities had to return by other ones, paying afresh, of course. Consequent upon the decision of the Courts, ordering the local agent of the Norddeutscher Lloyd Company to refund the cost of return tickets not used, in similar circumstances, to those who held them for travel by that line, the local agent of the Austrian Lloyd reimbursed as many return tickets as were issued in Egypt for the Austrian Lloyd as the funds at his disposal permitted. The total sum due was about £2,000, of which he paid back £1,500. The balance of £500 has now been received by the American Consul in Alexandria, and he will pay it out.

THE "HAPAG" AT PANAMA.—The office building of the Hamburg-Amerika Line on the water front at Cristobal, which was begun in June, 1914, but upon which work was temporarily suspended after the outbreak of war, is nearing completion, and the offices of the line in Colon will be moved into it shortly. The building is a two-storey structure. The ground floor will be used as offices and the first floor as residence for the staff.

THE FREIGHT MARKETS.

(FROM OUR OWN CORRESPONDENTS.)

London.

There is little change to record in the level of freight rates. The Plate has yielded little actual business, and the same may be said of the Eastern section. The North Pacific market likewise is characterised by quietness. Fixed to load at Buenos Ayres or La Plata, the *Cloutsham*, 7,000 tons, 10 per cent., has been taken up for prompt loading at 62s. 6d. to Genoa. From Rosario there are openings for tonnage to load to New York at 38s., with option of part cargo seeds at 2s. more. American coal business from Virginia offers 42s. to West Italy for September or October loading, whilst the quotation to the Plate is about 33s. 6d. To Antofagasta \$7 is suggested as the figure. Tonnage is still required for Montreal loading for Avonmouth, and for this business 9s. 3d. is offered, option to Glasgow at 9s. 6d. From the Northern Range 11s. has been conceded to the *Nea Hellas*, a 25,000-quarter vessel, which gives October loading. Also from the Northern Range, a 45,000-quarter, 10 per cent. boat has been taken up at 8s. to Marseilles, with oats. From the Gulf to West Italy for a 27,000-quarter, 10 per cent. vessel, early September, 11s. has been paid. Bombay to the United Kingdom is worth about 52s. 6d. From Saigon and/or Haiphong the *Valdura*, 8,500 tons, has been closed at 76s. to Marseilles, October 10 cancelling. There is still a demand for big carriers for time charter business, and 13s. can be obtained for a year's Transatlantic trading. A 6,000-ton steamer taken up for a United Kingdom-British North America round has secured 16s. 3d. From Huelva with ore to the United States the rate stands at about 13s. to 13s. 6d. A scarcity of tonnage has occasioned dullness in the outward Tyne market. Rates are steady, the figure for Genoa being 30s., whilst as much as 35s. has been paid for Trapani. In the Bay section the rates are firm at 21s. 6d. to 22s. 6d. for the principal port. Representative fixtures are: Boulogne, 22s. 6d.; and Rouen, 17s. Cardiff, too, records a quiet market. Tonnage has here been offering more freely. Recent fixtures include: Oporto, 20s. 6d.; Genoa-Savona-Leghorn, 29s. 6d.; Genoa, 29s. 6d.; Lisbon, 18s. 6d.; and Bordeaux, 26 fr. Birkenhead to Malaga has paid 22s., and Swansea to Dieppe has conceded 16s. 6d. to the steamer *Allie*. Newport to Bordeaux has taken up the *Mayo* at 26 fr. Hull to Rouen has been done at 17s.

Glasgow.

Business has been more active and rates firmer since our last report, but on some days chartering was restricted owing to the scarcity of tonnage. The losses of vessels which have been sunk by submarines, and the large number of steamers which have been sold recently is having an appreciable effect in reducing the amount of tonnage available. The outward coal trade has been pretty active, the following fixtures having been reported:—Glasgow to Genoa, 3,600 tons, 30s.; Glasgow to Bordeaux, 3,000 tons, 30 fr.; Firth of Forth to Rouen, 1,200 tons, 19s.; Fife port to Rouen, 2,100 tons, 19s. 3d.; Glasgow to Bayonne, 2,300 tons, 30-50 fr.; Glasgow to Bordeaux, 2,550 tons, 30 fr.; and Greenock to Genoa, 3,500 tons, 30 fr. Homeward markets were as a rule quiet, but there was a good inquiry in grain and coal freights from America. Newport News, 40,000 quarters, 10 per cent. (oats), West Italy, 8s., September. From the River Plate there was little doing, but rates remained firm. In the Eastern trade a Glasgow steamer was fixed at 76s. rice, and 78s. 6d. maize from Saigon to Marseilles or Havre. The outlook is better for October-November tonnage.

Newcastle-on-Tyne.

In consequence of the continued dullness of business on the local coal market, there has been only a moderate amount of chartering done in the Tyne freight market during the week under review. As licences are granted very sparingly for neutral countries, the great bulk of chartering is for France and Italy. In spite of the serious detention of tonnage at Rouen, there is no slackening in the despatch of cargoes to that port. Rather more steamers have been offered for hire during the week and rates for some destinations show slight weakness as a result. The general trend of prices, however, is still upward. Coastwise, rates have advanced to 8s. 9d. to London, an increase of 1s. 6d. on the week, but, at the time of writing, an easier tone prevails and quotations are based on 8s. 3d. to 8s. 6d. In the North France section, Calais and Dunkirk are weaker, Caen is from 6d. to 1s. 6d. lower, and Havre from 1s. 6d. to 2s. decreased, but Rouen has been done at advances of from

3d. to 6d. on last week's figures. Bywards, Bordeaux is firmer and St. Nazaire fully bid dealer. Rates for the Mediterranean in the north tending to advance. On the week's work, Genoa is firm 6d. to 1s. higher, and Savona from 1s. to 1s. 6d. more, whilst Algiers and Oran are steady on the basis of recent prices. Fixtures among the last report include the following:—Boulogne, 300, 16s. 6d.; Bordeaux, 2,000, 22s.; 2,400, 22s. 6d.; Calais, 1,600, 18s.; 650, 24s.; Caen, 200, 22s.; coke; Cote, 2,800, 30s.; Caen, 1,200, 16s. 6d.; Dunkirk, 400, 17s.; Fecamp, 1,650, 17s. 6d.; Genoa, 7,000, 30s.; 1,000, 30s. 6d.; 3,500, 30s.; Havre, 1,200, 16s.; 1,500, 16s. 6d.; London, 1,700, 8s.; 1,750, 8s. 6d.; 1,700, 8s. 9d.; 1,700, 8s. 5d.; Lisbon, 2,500, 22s. 6d.; Las Palmas, 21s., 24s.; Oporto, 1,700, 21s.; 1,800, 20s.; Oporto, 1,000, 24s.; Rouen, 1,600, 18s.; 4,500, 17s. 6d.; 600, 18s.; 1,600, 8s. 3d.; 3,000, 17s. 9d.; 900, 17s. 6d.; 1,500, 17s. 6d.; St. Nazaire, 3,500, 21s.; 2,300, 21s. 6d.; Savona, 4,800, 30s.; 5,000, 30s. 6d.; and Treport, 800, 22s. 6d., coke; 900, 23s., coke.

Liverpool.

The market has developed on expected lines, outward freights being more active and firmer and a better tone prevailing in some homeward trades. A good deal of tonnage has been fixed outwards at the coal ports, Italian ports paying 29s. to 30s. and River Plate improving at 25s. 6d. The Virginia rate for coals to River Plate are firm at 32s. 6d. and at 42s. to Italian ports. Partington (Ship Canal) to Genoa also made 30s. for coals, and other local fixtures outwards are:—Liverpool to Alexandria, 22s. 6d.; Liverpool to Archangel, 35s.; to Swansea, 8s.; and to Limerick, 12s. Time charter business has been steady at full rates, a North American round paying 16s. 3d., and a 12 months' engagement, same trade, making 13s. 6d. on deadweight. Of the homeward trades, North America displays the most activity, and with only a moderate supply of tonnage in sight, rates hold to firmness all round. Heavy grain from the Gulf and Montreal to West Italy pays the same rate of 11s. 9d., and Northern Range to same destination is worth 10s. 6d. for current loading. There are inquiries for further tonnage at Range ports for the Mediterranean and also at the Gulf for good capacity cotton boats, the rate indicated being 145s. River Plate continues quiet, but still holds to the 62s. 6d. rate to the United Kingdom. After a period of dullness Eastern markets are a little more active. Rice ports adhere to recent rates, but market conditions generally are not very attractive. Calcutta has paid 67s. 6d. to United Kingdom, Bombay 52s. 6d. (one) and 53s. 9d. (two) home ports, and Persian Gulf to the Thames made 61s. 6d. on deadweight. Mediterranean markets homewards are steady, Huelva to Garston again being done at 12s. and Greek Islands to Birkenhead paying 30s. Nitrate ports about steady, but the North Pacific rules dull. The market for sail tonnage is dull and featureless.

Cardiff and Swansea.

During the past month tonnage to carry 590,280 tons was fixed to load at Cardiff, Penarth, Barry or Newport, against 448,800 and 990,860 tons in August, 1914 and 1913, respectively. For Swansea and Port Talbot shipment, 183,840 tons was fixed last month, compared with 57,920 and 187,380 tons in August, 1914 and 1913, respectively. It must be borne in mind that chartering in August of 1914 was on a particularly slow scale, as war had only just broken out and operations were disorganised by the requirements of the Allied Governments. The money exchange problem also prevented the conclusion of new business. During the past week chartering was on an active scale at both Cardiff and Swansea and rates were well upheld for the greater part of the week, but on Monday an easier tendency was noticeable which can be attributed to the fact that merchants having covered most of the urgent orders were not in such pressing need of tonnage, which, by the way, had been attracted by the high figures obtainable, and consequently adopted a hold-off attitude in the hope of reducing rates which had risen to levels almost on a par with the top figures touched this year. Altogether tonnage to carry 210,430 tons was fixed to load at Cardiff, or 55,380 tons more than in the preceding week. For the Mediterranean the demand was fairly active, and with tonnage supplies inadequate rates ruled firm on the basis of Alexandria, 30s. (500 tons delivery); Algiers, 30 fr. (twice); Civita Vecchia, 31s. 3d.; Genoa, with options, 30s. (fourteen), 29s. 6d. (six), 31s. and 29s.; Lisbon, 19s. (350 tons delivery, three), 18s. 6d. (500 tons delivery, twice), 20s. (350 tons delivery); Leghorn, 30s.; Marseilles, 32 and 33 fr.; Naples or Leghorn, 29s. (800 tons delivery); Oporto, 21s.; and Port Said, 32s. 6d. (twice) and 32s. (twice). Genoa, it will be noted, was a particularly active market, no fewer than 22 steamers being taken. Bay and Coasting chartering was not quite so active,

and rates after reaching almost record levels developed an easier tone on a less pressing demand. Bordeaux was done at 26 fr. (five) and 26½ fr.; Brest 13s. 6d.; Caen, 16s. and 15s. 6d.; Calais, 17s.; Cherbourg, 16s.; Dieppe, 15s. 6d. (a new high record); Honfleur, 15s. 6d. (twice) and 15s. 9d.; Havre, 14s. 9d.; Havre Canal, 16s.; Nantes, 25 fr. (twice); Rouen, 16s. 9d. (twice); 16s. 6d. and 17s. (twice); St. Malo, 13s. 6d. (three); and St. Nazaire, 24 fr. The South American market was quiet, but much stronger in tone, while the Islands section was slow and steady on the basis of Las Palmas or Teneriffe 17s. and St. Michaels 18s. 6d. Chartering from Swansea was active last week, tonnage aggregating 61,520 tons being fixed, or 4,340 tons more than in the previous week. Rates for all directions maintained a firm tone, but opened the present week with an easier tendency. Some of the fixtures concluded were:—Bordeaux, 28 fr. (twice—a new high record) and 27 fr.; Caen, 16s. 6d. (twice) and 16s. 3d.; Dunkirk, 18s. 6d.; Havre Canal, 16s. (twice); Havre, 14s. 9d. and 16s.; La Pallice, 24 fr.; Nantes, 25 fr.; Rouen, 17s. (twice) and 17s. 6d. (twice) and St. Nazaire, 25 fr. (a new high record). Mediterranean business was confined to Genoa, with options at 30s. 6d., 31s. (three) and 31s. 6d.; and Valencia, 26s. A good number of fixtures were concluded for Port Talbot loading, Algiers fixing at 30 fr.; Calais, 17s.; Caen, 15s. 6d. (twice); Nantes, 25 fr.; Fecamp, 16s.; Rouen, 17s.; Bordeaux, 26½ and 26 fr.; and Tonnay Charente, 26 fr.

Hull.

Chartering from Hull and the Humber ports is keeping on an active scale. In the Mediterranean direction rates are based on 29s. for Genoa from Hull, 30s. was paid for Civita Vecchia from Hull, and 29s. was done for Marseilles from Hull. In the coasting freight market the tone has kept steady and rates are represented by 17s. paid for Rouen from Hull, 16s. for Dieppe from Hull, 16s. for Havre from Hull, 16s. for Honfleur from Hull, 8s. for London from Hull, and 9s. for London from Goole.

COMPANY REPORTS.

Scholefield Steam Shipping Company, Ltd.—The report for the year ended June 30 last states that the balance brought forward from last year (£9,011) was larger than usual because that year, instead of paying a final dividend of 5 per cent., which would have absorbed £3,734, the whole was carried forward in consequence of the war and the uncertainty in the financial position of national affairs. The profits upon completed voyages, &c., for the past 12 months amount to £46,937, making, with the amount brought forward £55,948. Out of these profits the directors have provided liberally for depreciation by paying off all the outstanding debentures, amounting to £17,000, and have paid two interim dividends, one of 6d. per share in October, and 1s. per share in February. They now propose to pay a final dividend of 2s. 6d. per share, making a total distribution of 20 per cent. for the year. These dividends will absorb £14,938, and, after setting aside £5,000 towards income-tax, and £5,000 for future surveys and repairs, the balance of £11,322 is carried forward. The new steamer which was expected to be ready next October will be delayed owing to the shipbuilders having had to set everything aside for Government work and the directors do not expect delivery until next year, by which time they hope to have accumulated a substantial sum out of profits towards the payment. The directors also announce that they have invested £5,000 in the last War Loan.

Manchester Liners, Ltd.—The report for the year ended June 30 states that the period under review, by reason of the abnormal conditions prevailing, has been one of anxiety, and the services operated by the company have only been maintained under considerable difficulty and disorganisation. In addition, a portion of the company's tonnage has been, and still is, engaged in Admiralty employment. To replace the *Manchester Commerce*, a steamer under construction, of 9,350 tons d.w., suitable for the company's requirements, and expected ready in April last, was purchased. In addition, contracts for two further steamers of 9,150 tons d.w. were entered into, but, owing to the practical cessation of commercial work, by reason of Government requirements, it is impossible to say when these steamers will be completed, though it is hoped the vessel first purchased will be delivered in the near future. Redemption of debentures has proceeded in accordance with the provisions of the trust deeds, first debentures to the extent of £16,300, and "A" debentures £8,200, having been purchased and cancelled during the year, leaving the amounts outstanding at June 30 £86,300 and £76,800 respectively. The steamers of the

fleet have been maintained in a condition of thorough efficiency, all repairs, renewals, cost of periodical surveys and upkeep having been provided out of revenue. The profit on the year's trading amounts to £205,842. After providing for debenture interest, preference share dividend, directors' fees, reserve for income-tax, and including the amount brought forward from last year, the balance available is £186,051. Of this it is proposed to write off £80,000 for depreciation, to carry to general reserve £50,000, to pay a dividend of $7\frac{1}{2}$ per cent., together with a bonus of $7\frac{1}{2}$ per cent. on the ordinary share capital of the company, absorbing £33,358, to transfer to first debentures reserve fund as per trust deed £3,339, leaving a balance of £19,324 to carry forward. The sum of £50,000, being the equivalent of the amount it is proposed to transfer to reserve, has been invested in the Government $4\frac{1}{2}$ per cent. War Loan issued in June.

R. & W. Hawthorn, Leslie & Co., Ltd.—In their report for the year ended June 30, the directors recommend the shareholders to confirm the payment of the additional dividend for the year ended June 30, 1914, which was paid in March, 1915. After making an allowance of £45,215 for depreciation and for leasehold redemption fund, and paying all interest and other charges, and the additional dividend mentioned, there remains an available balance of £169,726, which the directors recommend should be disposed of as follows:—To meet the interim dividend of 5s. per share, less tax, paid in March last, £10,742; to pay a further dividend of 15s. per share, less tax (making the total payment to the shareholders 10 per cent. for the year), £30,985; to add to the reserve fund account (making the balance thereon £236,000, exclusive of leasehold sinking fund), £50,000; to set aside for future extensions and improvements of plant, &c. (making, with the balance brought forward from last year, a total of £60,000), £48,067; leaving to carry forward to next year, £29,932. The directors have thought it prudent to write off a much larger sum for depreciation than would have been necessary in normal times. At the same time they have thought it wise to increase as little as possible the permanent capital accounts of the company, and to provide out of revenue for the necessary extensions and improvements of its plant and property. A large proportion of the amount now set aside for this purpose will be absorbed during the current year. The recommendation as regards capital expenditure is concurred in and approved of by the company's auditors. The financial position of the company has been greatly benefited by the creation of the reserve fund, which has been added to from year to year, and the further provision now recommended will assist the company in meeting any change of trade conditions which it may be fairly assumed will follow the termination of the war.

PORT NOTES.

Lübeck.—The town of Lübeck proposes to undertake a considerable harbour extension next year. In the second outer harbour a new length of quay is to be built, suitable for large vessels. The estimated cost of the work is £35,000.

Scarborough.—At the annual meeting of the Scarborough Harbour Commissioners, the chairman referred to the contemplated improvements at the harbour, and said that the whole matter remained in abeyance. They were, however, by no means abandoning their improvement scheme.

Curaçao.—Coal is imported into Curaçao solely for bunkering, the consumption for other purposes not exceeding 2,000 tons per annum. All coal comes from the United States and is of the descriptions known as Pocahontas, and New River. In 1913, Curaçao's imports amounted to 54,208 tons, valued at \$159,573; in 1914 they totalled 56,968 tons, valued at \$174,174. This fuel came from Norfolk and Newport News, in steamers of 4,500 to 5,500 tons, bringing full cargoes. As the depth of water at the docks is 20 to 30 ft. these, and even much larger steamers, can dock at the coal piers and discharge without the use of lighters. In unloading, coal is delivered on the dock by the steamer's derrick, and then worked by hand labour. In delivering coal to ships it is carried by labourers in baskets. The average cost of unloading and delivering into bunkers of purchasing steamers is stated to be 50 to 60 c. per ton. The average amount of coal handled per day in unloading is 500 to 600 tons; the record for delivering coal into bunkers of steamers from the pier is 174 tons per hour. Occasionally lighters are used; from these the delivery is somewhat slower. There are no port charges at Curaçao except pilotage, which does not exceed \$30 for entry and clearance of the largest steamers.

NEWS PARAGRAPHS.

Tilbury Contracting & Dredging Company.—This company has removed from 74, Great Tower Street, London, E.C., and its address is now 35, Mark Lane, E.C. Telegrams: Lighterage-Fen-London. Telephone: Avenue 7774.

The Rhein- und See-Schiffahrts Gesell. (Cologne) and the associated Mannheim Dampfschleppschiffahrts. Gesell. must be added to the list of those concerns which have secured exemption from calling a general meeting and publishing accounts for 1914.

New American Service.—A company is at present in course of formation at Boston, with a capital of £2,500,000, for the establishment of a regular steamship service between that port and San Diego, Los Angeles, San Francisco, Portland and Seattle, via the Panama Canal; 11 vessels, of from 10,000 to 11,000 tons each, are to be built for it.

Steel Prices.—Messrs. David Colville & Sons, Ltd., Dalzell Steel & Iron Works, Motherwell, inform us that the prices of certain of their manufactures are now as follow:—

Siemens steel boiler plates	£	d.
Mammoth quality	11	0 0 per ton
Land quality	11	0 0 ..
Siemens steel ship plates	10	0 0 ..
Siemens steel bars—		
Boiler quality	11	17 0 ..
Ship quality	11	0 0 ..
Siemens steel angles	1	5 0 ..

High Scandinavian Profits.—The Selmerske Rederei (Trondhjem) distributes 40 per cent. dividend for the first six months of 1915, and sailing ship companies which have been paying 10 per cent. dividend during recent years now realise 30 to 60 per cent. monthly return on their capital. A 7,300-ton steamer built for £48,000 in 1902 is yielding £4,500 net profit monthly on a six months' charter. The abnormal freight market has permitted the Norway-America Line (which started barely two years ago and is granted a State subsidy of £55,000 per annum) to dispense with its subsidy for the first nine months of this year and repay £4,170 of the amount received in 1914. The Transatlantic Aktiebolag (Gothenburg) has also been enabled to dispense with its £5,500 subsidy for 1915, and expects to be able to repay next midsummer the £11,000 subsidy for 1913 and 1914.

Clyde Trust and Dock Restaurants.—The Clyde Trustees are giving valuable aid to the directors of the Glasgow Sailors' Home in the efforts of the latter to establish restaurants for seamen and dock labourers at various points at Glasgow Harbour. The Trustees have no power to undertake work of this description themselves, but they have decided to erect at Princes Dock, at a cost of about £2,000, a building which the directors of the Sailors' Home will use as a restaurant for the benefit of all classes of harbour workers. The Trustees have also indicated their willingness to give free sites at other parts of the harbour for the erection of restaurants, and in other ways to provide for the workers. The needs of the men employed in shipyards are also being attended to. Lady Inverclyde, acting in conjunction with the Women's Emergency Corps has organised a system under which "refreshment carts," with attendants are on duty in the Fairfield shipyard at meal hours. This scheme is meeting with a good deal of success.

British Wrecks Reported in August.—The number and net tonnage of British vessels respecting whose loss reports were received at the Board of Trade during the month of August, 1915, and the number of lives lost, are as follow:—

Description.	No.	Net Tonnage.	Lives Lost.
Sailing	58	15,597	21
Steam	68	84,117	1,178
Total	126	99,714	1,199

* Including 27 sailing vessels and 2 motor vessels sunk by German warships.

† Including 26 steamers and 1 motor vessel sunk by German warships, a steamer of 2,225 tons sunk by mine, and 1 steamer of 72 tons sunk by a mine or by a German warship.

‡ Including 1,000 lives lost in steamers sunk by German warships, of which 1,115 are at present unknown, were lost in the main part of the month in the Aegean Sea, 57 lives lost in steamers sunk by mines, and 2 lives lost in a steamer sunk by a mine or by a German warship.

The figures include the losses of 16 sailing vessels of 2,004 tons and 4 steamers of 7,141 tons belonging to British possessions abroad, involving the loss of the lives of 1,036 persons, of whom 18 were lost in sailing vessels and 1,018 in steamers.

The Indra Line.—In our weekly table of Ship Sales will be found particulars of the seven vessels which Alfred Holt & Co., Liverpool, have purchased from F. B. R. van & Co., the vessels so transferred forming the Indra Line, namely: *Indra* by the latter firm. This means that Alfred Holt & Co. will be enabled as members of the New York & The Eastern Steamship Conference to extend their Indian services and particularly the New York-Panama trade in which the vessels have been accustomed to trade.

Dutch Insurance Association.—Dutch owners and insurance companies have started a new scheme to cover risks imposed by the new marine accident law. All the leading Dutch companies, including the Holland-Amerika Line, the "Nederlandsche Stoomvaart Maatschappij," Rotterdam, the Lloyd, Kon. Nederlandsche Lloyd, Kon. Nederlandsche Stoomboot Mij., and the West Indische Mail-vaart, have joined the association and pay as premium 3 per cent. on the annual wage bill of those employees covered by the new insurance scheme. In order to deposit with the State the guarantee fund prescribed by law, the association has raised a £83,330 5 per cent. loan. Further reference to the scheme is made on page 212.

Institute of Marine Engineers.—In his presidential address, delivered at the Institute on Tuesday, Sir Archibald Denny, Bart., took as his subject "Screw Propellers." In the course of his paper he dealt with the question of negative slip and showed how marine engineers wrongly assumed that the water which passed the screw did so at the same speed as the ship. This, he said, took no account of the following wake, since, as a general rule, the water was travelling past the screw at a considerably less speed than the speed of the vessel. The pitch of the screw to which it was designed was not usually the real pitch. If the ratio of pitch to diameter were small then the real pitch was considerably coarser than the apparent pitch. As regarded following wake this varied considerably in vessels of different form, a ship of full after form having a high following wake. The wake also varied with the direction of the rotation of the screws. Sir Archibald pointed out that much valuable data is thrown away by neglect of progressive trials. He showed a number of experiments by means of mechanical contrivances. One of these demonstrated clearly that propellers did not possess centrifugal action, as is erroneously supposed by many persons.

U.S. Warships and War Influence.—The European War is already having its influence on the design of U.S. warships. It is understood that experiments are being conducted at present

by the Navy Department with a view to affording greater protection to battleships against torpedo attacks, both from surface and undersea craft, and that the designs of the ships of the new programme will embody radical departures in this respect. The designs of the six destroyers for which bids from private builders are to be in by October 6, show the effect of the lessons already taught by the war, and the new boats will radically differ in essential particulars from their forerunners. For one thing the speed has been increased to 30 knots, and the radius of action has also been extended. The guns heretofore mounted in embrasures located on the main deck have been mounted in the superstructure amidships, so as to make them serviceable in all conditions of weather. The main dimensions of the new boats will be: Length, 310 ft.; beam, 30 ft. 7 in.; mean draught, 8 ft.; displacement, 1,125 tons; armament, four 4-in. quick-firing guns, two one-pounders and anti-aircraft guns, four triple-torpedo tubes. The machinery will consist as in the past of steam turbines with watertube boilers burning oil fuel.

Fiume Shipping During 1914.—Shipping in the port of Fiume has increased considerably during the past 18 months as a whole, though conditions have naturally been very unfavourable during the last year. The Königliche Ungarische Seeschiffahrts-Aktiengesellschaft "Adria," the "Ungaro Croata," the "Ungaro Croata für frei Schifffahrt" and the "Oriente" Gesellschaft have added a number of vessels to their fleets. The number of German steamers, chiefly belonging to the Deutschen Levante Linie, has not varied. Traffic under the Norwegian, Dutch, Spanish, French and Montenegrin flags, always inconsiderable, was entirely absent last year. Emigrant traffic to New York was served by 22 Cunard vessels. During the second half of 1914, traffic was entirely paralysed by the war, but from January 1 to July 31 the aggregate arrivals and departures of steamers were as below, besides which there were about 950 arrivals (43,000 tons register) and as many departures of sailing vessels, almost exclusively Italian and Austrian, in nearly equal numbers.

Flag.	Steamer Arrivals.		Steamer Departures.	
	No.	Tons Reg.	No.	Tons Reg.
Hungary ...	3,884	817,811	3,883	821,208
Austria ...	589	455,570	591	439,403
Italy ...	143	83,918	144	85,006
Great Britain ...	68	265,903	65	255,087
Germany ...	30	41,334	30	41,349
Greece ...	7	5,889	7	5,968
Denmark ...	5	7,923	5	7,924

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF LAUNCHES.

Date of Launch.	Name of Vessel and Type.	Owners.	Builders.	Approx. Dimensions.			Propelling Machinery and Builders of Machinery.			Remarks.
				L × B × D.						
July 13	Mesafos (cargo)	Norwegian East Africa Line	Akers mek. Verksted, Christiania.	194'	30'	15'	Tr. Exp.	131, 22, 37½	28	
Aug. 29	Remus (cargo)	Reederei Lindvig, Christiania.	Trondhjems mek. Verksted	237'	56'	10'	Tr. Exp.	750 i.h.p.	..	..
Aug. 29	Hera (motor-tanker)	Nederlandsche Stoomboot Maatschappij.	Schiffswerft "Dordrecht"	163' × 28' × 12'.			2 Kromhout engines; 550 i.h.p.			800 tons, 11 knots.
Aug. 29	Island (cargo)	Mollet & Co., Ltd., Glasgow.	Napier & Miller, Old Kilpatrick.	149' 7"	50' 8"		Tr. Exp.	25, 41, 68	45	
Aug. 12	Stenwader (cargo)	Cuxhaven Hochseefischerei A.G. "Alte Liebe."	H. C. Stulcken, Sohn, Hamburg.	118' × 23' × 13'.			Superheated. 400 i.h.p.			10 knots.
Aug. 14	Greta (cargo)	Deutscher Lloyd, Bremen.	Schiffbauerei Unterweser, Lehe, Bremerhaven.	134' × 23' × 13'.			Superheated. 450 i.h.p.			
Aug. 17	Barrister	T. & J. Harrison, Ltd.	Charles Connell & Co., Scotland.	352' 5"	47' 1"		Tr. Exp.	22, 37, 62	48	
Aug. 18	Columbia m.s. (cargo)	A.S. Det. Ostasiatiske Kompagni, Copenhagen.	A.S. Det. Østasiatiske Kompagni, Copenhagen.	425' × 55' × 38' 6"			Twin-screw. Single-acting Diesel engines, 4 stroke, directly reversible. 3,100 i.h.p., 125 r.p.m.			D.W. cap. 550 tons. Accommodates 10 passengers.
Aug. 18	Alaxara (cargo)	Australian Steamships, Ltd.	John Priestman & Co., Southampton.	280' × 40' × 20'.			Tr. Exp. 20, 33, 55			20

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF TRIAL TRIPS.

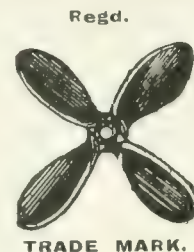
Aug. 5.	Island (cargo and pass.).	Vestergaard & Co., Copenhagen.	Halskov & Maskinbyggeri.	194' x 30' 15"	26	Tr. Exp. 1,450 i.h.p.		14 knots. 103 1st and 60 2nd class pass.
Aug. 12	Australien m.s. (cargo).	East Asiatic Co., Copenhagen.	Burmeister & Wain, Copenhagen.	410' x 55' x 30½'		Burmeister-Diesel 6-cyl. single-acting, 4 stroke, directly reversible. 3,100 i.h.p., 125 r.p.m.		D.W. 9,200 tons. 127½ knots at 3,784 i.h.p. at 152.9 r.p.m.
Aug. 18	Hemling (cargo and cargo).	Lamport & Holt, Liverpool	A. McMillan & Son, Dumbarton.	456' x 56' 7"	28	Quad. Exp. 4,000 i.h.p.	Harland & Wolff.	Extensive refrigerating cap. for meat trade.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and type.	Tonnage.	Dimensions. Draught in ()	Sold by, to	Builders, hull and year.	Machinery and builders.	Remarks.
Archimedes , ss., (well dk.), (ex <i>Tolo</i> , ex <i>Sarah Radcliffe</i>)	2,251 gr. 1,410 net.	272½' × 38½' × 18½'	C. Hadjipateras and N. & D. Pateras, Piræus, to buyers not stated	Ropner & Son, Stockton (1889)	21, 35, 57 × 39, (Blair & Co., Stockton)	
Artemis , ss., (shelter dk.)	5,076 gr. 3,068 net.	110' × 51' × 26½'	Akties. Chr. Michelsen & Co., Bergen to Norge Mexico Gulf Line, Tonsberg	Ropner & Sons, Stockton (1910)	26½, 44, 72 × 48 (Blair & Co., Stockton)	
Barnbek (barque), (ex <i>Gilvian</i> , renamed <i>Pacific</i>)	2,277 gr. 2,108 net.	289½' × 42' × 21½'	Knohr & Burchard, N.f.l., Hamburg, to French buyers	Whitehaven S.B. Co. (1886)		Captured by French cruiser in August, 1914, and taken to Brest. Sold for about £8,000.
Bifrost , ss. (pt. awning dk.), (ex <i>Richmond</i>)	2,084 gr. 1,219 net.	279½' × 40' × 15½'	Rederi Aktieb Bredablick (C. G. Thulin, Manager), Stockholm to B. Stoll-Nielsen, Haugesund	Ropner & Son, Stockton (1896)	21, 34, 56 × 36 (Blair & Co., Stockton)	
Caspian , ss., (tween dk.)	3,606 gr. 2,317 net.	330' × 47' × 26½'	Nelson, Donkin & Co., London, to British buyers	Edwards S.B. Co., Newcastle (1894)	24, 40, 66 × 45 (Blair & Co., Stockton)	
Castano , ss., (spar dk.)	4,520 gr. 2,857 net.	35½' × 47½' × 19½'	M. M. de Arrotegui, Bilbao to Norwegian buyers	Sir Raylton Dixon & Co., Middlesbrough (1900)	25, 40, 68 × 48 (Sir C. Furness, Westgarth & Co., Middlesbrough)	Price about £66,000.
Dauntless , ss., ...	2,157 gr. 1,361 net.	287½' × 43' × 18½'	Earl of Chester, SS. Co. (Martin & Marquand, Mgrs.), Newcastle, to British buyers	Blyth S.B. Co., Blyth (1897)	21½, 35½, 58½ × 39 (Blair & Co., Stockton)	Price about £36,000.
Fama , ss. (well dk.)	2,219 gr. 1,358 net.	290½' × 39' × 19½'	Otto Banek, Helsingborg to neutral buyers	J. Priestman & Co., Sunderland (1890)	20½, 36, 59 × 39 (Hutson & Corbett, Glasgow)	
Grayson , ss. (ex <i>Diana</i>)	334 gr. 130 net.	135½' × 29' × 15½'	H. & C. Grayson, Liverpool	J. Jørgensen, Drammen (1871)	16, 24 × 24 (Machen & Co.)...	Repair ship; description in SHIPPING AND SHIPPING RECORD March 12, 1914.
Huron , ss. (part awning dk.)	3,090 gr. 1,990 net. 4,900 dw.	325' × 41½' × 19½'	Mercantile SS. Co., London, to British buyers	J. L. Thompson & Sons, Sunderland (1896)	24, 38½, 64 × 42 (T. Richardson & Sons, Hartlepool)	Price about £36,000.
Indra , ss., ...	5,713 gr. 3,620 net.	430' × 54' × 30½'		C. Connell & Co., Glasgow (1913)	26½, 45, 75 × 54 (Dunsmuir & Jackson, Glasgow)	
Indradeo , ss., (spar dk.)	5,559 gr. 3,507 net.	430½' × 53½' × 30½'		C. Connell & Co., Glasgow (1910)	26, 44, 73 × 48 (D. Rowan & Co., Glasgow)	
Indraghiri , ss., ...	5,723 gr. 3,600 net.	430½' × 53½' × 30½'	Indra Line (T. B. Royden, Mgr.), Liverpool, to Alfred Holt & Co., Liverpool	London & Glasgow Co., Glasgow (1912)	26½, 45, 75 × 54 (London & Glasgow Co.)	
Indraknala , ss., ...	5,691 gr. 3,607 net.	430' × 54' × 30½'		C. Connell & Co., Glasgow (1912)	26½, 45, 75 × 54 (Dunsmuir & Jackson, Glasgow)	
Indrasamha , ss., ...	5,197 gr. 3,367 net.	410' × 49½' × 29½'		C. Connell & Co., Glasgow (1901)	26, 44, 73 × 48 (D. Rowan & Co., Glasgow)	
Indrawadi , ss., ...	5,194 gr. 3,361 net.	410½' × 49½' × 29½'		C. Connell & Co., Glasgow (1902)	26, 44, 73 × 48 (D. Rowan & Co., Glasgow)	
Inverclyde , ss., ...	4,995 gr. 3,214 net.	400½' × 52½' × 29½'	Inver SS. (T. B. Royden) Liverpool, to A. Holt & Co., Liverpool	C. Connell & Co., Glasgow (1906)	25, 42, 70 × 48 (Dunsmuir & Jackson, Glasgow)	—
Inverness-shire , (barque)	2,307 gr. 2,147 net.	282½' × 42½' × 21½'	T. Law & Co., Glasgow, to buyers not stated.	R. Duncan & Co., Port Glasgow (1894)		Sold in damaged state at an Australian port.
Invertay , ss., (shelter dk.)	3,974 gr. 2,541 net. 7,437 dw.	379½' × 50' × 25½'	Law, Leslie & Co., London, to British buyers	W. Dobson & Co., Newcastle (1906)	28, 42, 72 × 48 (N.E. Marine Eng. Co., Newcastle)	
Lodorer , ss., (spar dk.) (ex <i>Sandyford</i>)	3,207 gr. 2,053 net.	325' × 48' × 16½'	Lodore SS. Co. (Watson, Munro & Co., Mgrs.) to British buyers.	J. Priestman & Co., Sunderland (1904)	25, 41, 67 × 45 (Richardsons, Westgarth & Co., Sunderland)	
Merity , ss. (spar dk.) (ex <i>Kong Arthur</i>)	3,968 gr. 2,589 net.	310½' × 47' × 20'	Cia Commercio, e Nav., Rio de Janeiro, to A. Oddefjeld, Bergen.	R. Stephenson & Co., Newcastle (1905)	25, 41, 67 × 45 (Blair & Co., Stockton)	Price about £66,750.
Othello , ss., ...	3,680 gr. 2,391 net.	353½' × 47½' × 25½'	Red Cross SS. Co. (C. T. Bowring & Co., Mgrs.), Liverpool	Northumberland S.B. Co., Newcastle (1905)	24, 40, 66 × 48 (Wallsend Slipway Co., Newcastle)	
Palestrina , ss., (spar dk.)	3,489 gr. 2,209 net.	350' × 46½' × 16½'	Jenneson, Taylor & Co., Sunderland, to British buyers.	Bartram & Sons, Sunderland (1898)	24, 39, 64 × 42 (J. Dickinson & Sons, Sunderland)	Price about £43,000.
Quito , ss. (spar dk.)	3,358 gr. 2,153 net. 5,500 dw.	330' × 45½' × 16½'	Bank Line (A. Weir & Co., Mgrs.), Glasgow, to Charlton, McAllum & Co., Newcastle	W. Hamilton & Co., Port Glasgow (1900)	24, 40, 65 × 42 (Dunsmuir & Jackson, Glasgow)	Price about £42,000 net.
Riverdale , ss., (spar dk.)	4,206 gr. 2,752 net.	360' × 48' × 20½'	Borderdale SS. Co. (J. Little & Co. (Glasgow), Ltd.), Glasgow, to Plisson S.N. Co., Cardiff	Sunderland S.B. Co. (1900)	23, 42½, 66½ × 48 (N.E. Marine Co., Sunderland)	Price about £52,500.
Walcheren , ss., (turret dk.), (ex <i>Norman Isch</i>)	3,531 gr. 2,230 net.	341½' × 45½' × 21½'	Stoomv. Maats Walcheren (W. Ruys & Zoon, Rotterdam, to Norwegian buyers	W. Doxford & Sons, Sunderland (1896)	24½, 40, 65 × 42 (W. Doxford & Sons, Sunderland)	

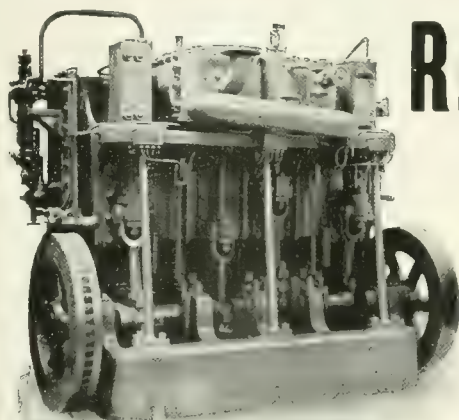


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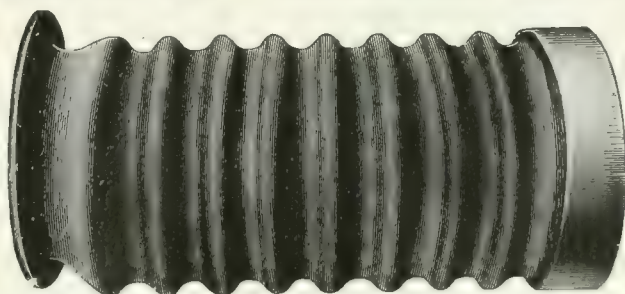
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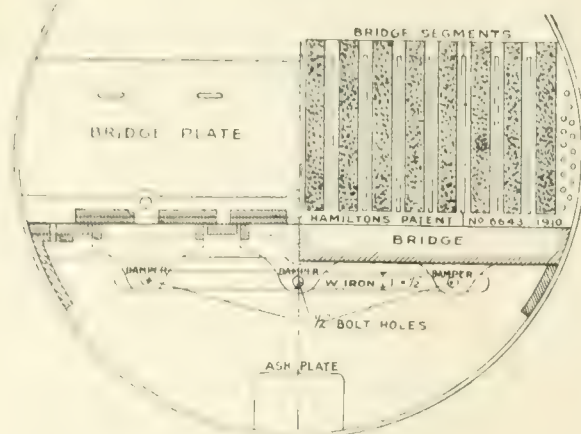
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Edina Manufacturing Co., 19b, BroadWynd, Leith.

BEDDING & NAPERY—

Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

BEMAL CONDENSER TUBES—

Yorkshire Copper Works, Ltd., Leeds.

"BITUMASTIC" ENAMEL MANUFACTURERS—

Wailles Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

BLINDS—

Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

BLOCKS—

Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

BLOWERS—

Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.

Davidson & Co., Ltd., Sirocco Engineering Works, Keith, James, & Blackman Co., Ltd., 7, Farrington Avenue, London, E.C.

BOATS—

Crichton, J., & Co., Saltney Shipyard, Chester.

Leitch, John, & Co., The Ferry, Renfrew, Scotland.

BOILERS—

Central Marine Engine Works, West Hartlepool.

Elliot & Jeffery, East Dock, Cardiff.

Harris Bros., Ltd., Cambrian Dry Docks, Swansea.

Hawthorne, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.

Howden, James, & Co., Ltd., Scotland St., Glasgow.

Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.

Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.

White, J. Samuel, & Co., East Cowes, I.W.

BOILER CIRCULATORS—

Beresford Engineering Co., Beresford Lane, Cardiff.

BOILER CLEANER—

Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COMPOSITION—

Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER COVERING—

Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

BOILER MOUNTINGS—

Cockburns Ltd., Cardonald, Nr Glasgow.

McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

Royles Ltd., Irlam, Nr. Manchester.

BOILER PLATES (Steel)—

Leeds Forge Co., Ltd., Leeds.

Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

BOILER PRESERVATIVE—

Atlas Preservative Co., Ltd., Deptford, S.E.

BOILER TUBES—

Yorkshire Copper Works, Ltd., Leeds.

BOLTS AND NUTS—

Coventry Chain Co., Ltd., Coventry.

BORING MACHINES—

Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

Greenwood & Batley, Ltd., Albion Works, Leeds.

BRASS & COPPER FITTINGS—

McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BRASS & COPPER RODS—

Delta Metal Co., Delta Works, East Greenwich, London, S.E.

BRASS FOUNDERS—

Billington & Newton, Ltd., Longport, Staffs.

Chambers, John, Ltd., Lowestoft.

Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

Williams, Wm., Alexandra Brass Foundry, Cardiff.

BRASS NAME-PLATES—

Metograph Co., 280, Cathedral Street, Glasgow.

Rennie & Co., North Greenhill Road, Paisley.

BRASS TUBES—

Yorkshire Copper Works, Ltd., Leeds.

BRASSWORK—

Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

Bronze (Manganese)—

Billington & Newton, Ltd., Longport, Staffs.

Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.

Callender's Cable & Construction Co., Ltd., Belvedere, Kent.

Delta Metal Co., Ltd., E. Greenwich, London, S.E.

Stone, J., & Co., Ltd., Deptford, London, S.E.

BRIGHT STEEL—

Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

BUCKETS—

Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BULKHEADS (Patent)—

Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

BUNTING—

Riley, Edward, & Co., Leeds.

BUOYANT DECK SEATS—

Crichton, C. & H., Ltd., Huskisson Engine Works, Linkleters Patent Ship Fittings Co., Hudson Street, North Shields.

BUOYS—

Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.

Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

CABINET MAKERS—

Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

CABLES (Chains)—

Hingley & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

Sykes, Richard, & Son, Ltd., Cradley Heath.

Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.

Wright, Joseph, & Co., Ltd., Tipton, Staffs.

CAISSONS & DOCK GATES—

Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

CALORIFIERS—

Low, Archibald, & Sons, Ltd., 73, Merkland Street, Partick, Glasgow.

Royles Ltd., Irlam, Nr. Manchester.

CAPSTANS (Electric)—

British Thomson-Houston Co., Ltd., Rugby.

British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

Stothert & Pitt, Ltd., Bath.

CARGO BLOCKS—

Higginson & Co., 7, Hurst Street, Liverpool.

CARPETS—

Stewart, Archibald & Co., 40-48, Union St., Glasgow.

CASE HARDENING BOXES—

Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING COMPOSITION—

Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CASE HARDENING OIL—

Else, John, & Son, Ltd., 48, Muntz St., Birmingham

CAST BRASS PLATES—

Brown, Robert, & Co., 12, Espedair St., Paisley.

CASTINGS (Steel)—

Brown, John, & Co., Atlas Works, Sheffield, and Clydebank, Nr. Glasgow.

Darlington Forge Co., Ltd., Darlington.

Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

CASTINGS (Steel, Iron and Brass)—

Chambers, John, Ltd., Lowestoft.

Darlington Forge Co., Ltd., Darlington.

Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

McRobie, John & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

CEMENT—

Aberthaw & Bristol Channel Portland Cement Co., Ltd., Merthyr House, Cardiff.

CHAINS—

"Coventry" Chain Co., Ltd., Spon End Works, Coventry.

COAL—

Beynon, T., & Co., Ltd., Merthyr House, Cardiff.

Britannic Merthyr Coal Co., Ltd., Cambrian Bldgs., Cardiff.

Cambrian Collieries, Ltd., Cambrian Bldgs., Cardiff.

Davis, D., & Sons, Ltd., Cymric Bldgs., Cardiff.

Ebbw Vale Steel, Iron & Coal Co., Ltd., Merthyr House, Cardiff.

Fernhill Collieries, Ltd., Merthyr House, Cardiff.

Glamorgan Coal Co., Ltd., Cambrian Bldgs., Cardiff.

Harrisons (London), Ltd., 66, Mark Lane, E.C.

Naval Colliery Co. (1897), Ltd., Cambrian Bldgs., Cardiff.

Newport Abercarn Black Vein Steam Coal Co., Ltd., Merthyr House, Cardiff.

Powell Duffryn Steam Coal Co., Ltd., Cardiff.

Rhymney Iron Co., Ltd., Merthyr House, Docks, Cardiff.

COMPASSES (Ship)—

Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

CONDENSERS—

Belliss & Morcom, Ltd., Birmingham.

British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

Contraflo Condenser & Kinetic Air Pump Co., Ltd., 3, Central Buildings, Westminster, S.W.

Dawson & Downie, Elgin Works, Clydebank.

Royles, Ltd., Irlam, Nr. Manchester.

Weir, G. & J., Ltd., Cathcart, Glasgow.

White, J. Samuel, & Co., Ltd., East Cowes, I.W.

CONDENSER TUBES (Brass and Copper)—

Yorkshire Copper Works, Ltd., Leeds.

CONTROLLERS & CONTROL GEAR—

British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

Holmes, J. H., & Co., Portland Road, Newcastle-Reynolds, A., & Co., Ltd., Hebburn-on-Tyne.

CONVEYORS—

Mather & Platt, Ltd., Manchester.

COOKING APPARATUS—

Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

Grieve, T., & Sons, Bedford Street, North Shields.

COPPER PIPES—

Yorkshire Copper Works, Ltd., Leeds.

COPPERSMITHS—

Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

Chambers, John, Ltd., Lowestoft.

Low, Archibald, & Sons, Ltd., 73, Merkland Street, Partick, Glasgow.

Royles Ltd., Irlam, Nr. Manchester.

COPPER TUBES—

Yorkshire Copper Works, Ltd., Leeds.

CORK INSULATION—

BUYERS' GUIDE—continued.

DREDGE PLANTS—
W. & A. C. Ltd., Rotherham, N.
DREDGING—
A. & C. W. Ltd., Rotherham, N.
DRILLING MACHINES—
W. & A. C. Ltd., Rotherham, N.
DRILLS—
W. & A. C. Ltd., Rotherham, N.
DRILLS (Pneumatic and Electric)—
W. & A. C. Ltd., Rotherham, N.
DRY FITTINGS (Laundry)—
W. & A. C. Ltd., Rotherham, N.
DYNAMOS—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC CRANES—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC DERRICKS—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC DYNAMOS & MOTORS—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC FITTINGS—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC HEATING & COOKING APPARATUS—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC LAMPS—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC LIGHTING—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC LIGHTING PLANT—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC MOTORS—
W. & A. C. Ltd., Rotherham, N.
ELECTRIC WIRES—
W. & A. C. Ltd., Rotherham, N.
ELECTRICAL CONTRACTORS—
W. & A. C. Ltd., Rotherham, N.
ELECTRICAL ENGINEERS—
W. & A. C. Ltd., Rotherham, N.

ELECTRICAL INSTRUMENTS
(Ammeters)
British Thomson-Houston Co., Ltd., Rugby.
(Circuit Breakers)
British Thomson-Houston Co., Ltd., Rugby.
ELECTRICAL INSTRUMENTS
(Relays)
British Thomson-Houston Co., Ltd., Rugby.
ELECTRICAL INSTRUMENTS
(Voltmeters)
British Thomson-Houston Co., Ltd., Rugby.
ENAMEL MANUFACTURERS
Holzapfel, Ltd., Newcastle-on-Tyne.
ENGINE (Electric Light)
Belliss & Morcom, Ltd., Birmingham.
ENGINES (Land)
Chambers, John, Ltd., Lowestoft.
ENGINES (Marine)
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
ENGINE & DECK STORES
McGeoch, Wm. & Co., Ltd., 28, West Campbell Street, Glasgow.
ENGINE AUXILIARIES
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
ENGINE FITTINGS
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
ENGINE-ROOM OUTFITS
Grieve, T. & Sons, Bedford Street, North Shields.
ENGRAVERS
Brown, Robert & Co., 12, Espedair St., Paisley.
EVAPORATORS
Central Marine Engine Works, West Hartlepool.
EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)
Delta Metal Co., Ltd., E. Greenwich, London, S.E.
FANS
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
FEED-WATER HEATERS
Beresford Engineering Co., Beresford Lane, Cardiff.
FILES
Brown, John, & Co., Atlas Works, Sheffield.
FILTERS (Marine)
Central Marine Engine Works, West Hartlepool.
FIREBARS
Liverpool Patents Co., Ltd., Derby Square, James Street, Liverpool.
FIRE EXTINGUISHERS
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

FIRE-FIGHTING APPLIANCES—
Manning Engineering Co., Ltd., Meco Works, Sheffield.
FLAGS—
Kelley, Edward & Co., Leeds.
FLOATING DOCKS—
Hamilton, Wm., & Co., Ltd., Port Glasgow.
FLOOR COVERING—
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.
FORCED DRAUGHT—
Adam, J. M., & Co., Greenfield Iron Works, Dalmarnock, Glasgow.
FORGING PRESSES—
Perry, Henry, & Co., Ltd., Croydon Works, Leeds.
FORGINGS—
Brown, John & Co., Ltd., Atlas Works, Sheffield.
FORGINGS (Bronze)—
Delta Metal Co., Ltd., E. Greenwich, London, S.E.
FORGINGS (Steel)—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
FUMIGATORS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
FURNACE BRIDGES—
Hamilton, A., & Sons, Ltd., Bute Crescent, Docks, Cardiff.
FURNACES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
FUSES—
Reynolds, A., & Co., Ltd., Hebburn-on-Tyne.
GALLEY GEAR—
Grieve, T. & Sons, Bedford Street, North Shields.
GALVANIZERS—
Brady, F., & Co., Ltd., Eclipse Works, Glasgow.
GAS ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
GAUGES—
Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.
GEAR CUTTING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
GEARING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
GEARS—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
GEARS (Noiseless or Silent)—
British Thomson-Houston Co., Ltd., Rugby.
GOVERNORS—
Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.
GRINDING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.
GRINDING WHEEL MACHINES—
Stern, L., & Co., Ltd., Crown Iron Works, Glasgow.
HATCH COVERS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
HEATING APPARATUS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
HEATING ENGINEERS—
Ashwell & Nesbit, Ltd., Barkby Lane, Leicester.
HELM SIGNAL TELEMOTORS—
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
HIGH SPEED DRILLS—
Brown, John, & Co., Atlas Works, Sheffield.
HIGH SPEED STEEL—
Brown, John, & Co., Atlas Works, Sheffield.
HOISTS—
Mather & Platt, Ltd., Manchester.

BUYERS' GUIDE—continued.

HOSE—

Heinke, C. E., & Co., 33, 39, Grange Road, Bermondsey, London, S.E.

HYDRAULIC CRANES—

Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh

Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh

HYDRAULIC MACHINERY—

Armstrong, Sir W. G., Whitworth & Co., Ltd., Elswick Works, Newcastle-upon-Tyne.

Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Waygood-Otis, Ltd., Falmouth Road, S.E.

HYDRANTS—

McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

INDIARUBBER—

Heinke, C. E., & Co., 33, 39, Grange Road, Bermondsey, London, S.E.

INDICATORS—

Robinson, A., & Co., Ltd., Bootle, Liverpool.

INDUCED DRAUGHT—

Davidson & Co., Ltd., Sir John Eng'g Works, Belfast
Keith, James, & Blackman, Co., Ltd., 27, Farringdon Avenue, London, E.C.

INSULATIONS—

Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.
Liverpool Refrigeration Co., Ltd., Colonial House,

IRON ROOFS AND BUILDINGS—

Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

JOINTING MATERIAL (Manganese)—

Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell Street, E.C.

LAMPS AND LIGHTS—

Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.

LAUNCHES—

Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.
Leitch, John, & Co., The Ferry, Kenfrew, Scotland.

Livingstone & Cooper, Ltd., Hesse, Hull.
MacLaren Bros., Ltd., Dumbarton

Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.

Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.

Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

LAUNDRY MACHINERY—

Bradford, T., & Co., Salford, Manchester.

LAVATORY FITTINGS AND

APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

LEAD (Sheets and Pipes)—

Rimer Bros., Newcastle-on-Tyne.

LEAD (White and Red)—

Rimer Bros., Newcastle-on-Tyne.

LIFEBELTS AND BUOYS—

Speedings Ltd., Sail Works, Sunderland.

LIFTS (Window)—

Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.

LIFTS AND HOISTS—

Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh
Waygood-Otis, Ltd., Falmouth Road, S.E.

LIGHTERAGE—

Alexander, W. H. J., St. John's Wharf, Wapping, E.

LIGHTERS—

Chalmers, Wm., & Co., Ltd., Rutherglen, Nr. Glasgow.

Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

LIMEWASHING & DISINFECTING

MACHINES—
Stonehouse Works Co., Ltd., Houghton Street, West Bromwich.

LOCKS—

Kaye, Joseph, & Sons, Ltd., Leeds.

LOCOMOTIVE TUBES (Copper & Brass)—

Yorkshire Copper Works, Ltd., Leeds.

LUBRICATORS—

[Cranstonhill, Glasgow.
McRobie, John, & Sons, 94, Elliott Street,

MACHINE TOOLS—

Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.

Scriven & Co., Leeds Old Foundry, Leeds.

MACHINERY NAME PLATES—

Brown, Robert, & Co., 12, Espedair St., Paisley.

MAGNESIA—

Jones, Fredk., & Co., Ltd., Perren Street, Kentish Town, N.W.

MARINE ENGINEERS—

Bailey, C. H., Newport, Mon. Barry Docks.

Barry Graving Dock & Engineering Co., Ltd., Brown, John, & Co., Ltd., Clydebank, Nr. Glasgow.

Chambers, John, Ltd., Lowestoft.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.

Day, Summers, & Co., Ltd., Northam Ironworks, Delegación de la Compañía Trasatlantica, Cadiz.

Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.

Elliott & Jeffery, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.

Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.

Hawthorne, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.

Hill's Dry Docks & Engineering Co., Ltd., Cardiff.

MARINE ENGINEERS (contd).—

Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.

Livingstone & Cooper, Ltd., Hesse, Hull.
Mountstuart Dry Docks, Ltd., Cardiff.

Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Richardsons, Westgarth & Co., Ltd., Hartlepool,

Middlesbrough and Sunderland.
Shearman, John, & Co., Ltd., Cardiff.

Simons, Wm., & Co., Ltd., Renfrew, Nr. Scotland.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.

Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.

[Westminster, S.W.
Thornycroft, John I., & Co., Ltd., Caxton House,

Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.

White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.

Yarrow & Co., Ltd., Glasgow.

MARINE GOVERNORS—

Aspinall's Patent Governor Co., 7, Strand Street, Liverpool.

Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

MATTRESSES—

Stewart, Archibald, & Co., 40-48, Union St., Glasgow

METALLIC PACKING—

Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.

McConwell, A., & Co., Ltd., 60, Drury Buildings, Water Street, Liverpool.

United States Metallic Packing Co., Ltd., Bradford

METAL SPINNING—

Levick, John, Alma Street, Aston, Birmingham.

METALS (Patent)—

Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.

Delta Metal Co., Ltd., Delta Works, East Greenwich.

MOTOR BOATS—

Chambers, John, Ltd., Lowestoft.
Crichton, J., & Co., Saltney Shipyard, Chester.

Leitch, John, & Co., The Ferry, Kenfrew, Scotland.
Livingstone & Cooper, Ltd., Hesse, Hull.

Perman & Co., Ltd., 82-83, Fenchurch St., E.C.
Seamless Steel Boat Co., Ltd., Wakefield.

Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.

White, J. Samuel, & Co., Ltd., East Cowes, I.W.

MOTOR STARTING AND CONTROL

GEAR—
[on-Tyne.
Holmes, J. H., & Co., Portland Road, Newcastle-

Reynolds, A., & Co., Ltd., Hebburn-on-Tyne.

NAVAL ARCHITECTS' SUPPLIES—

Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

OIL CANS—

Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ECONOMISERS—

Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ENGINES—

British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

Edina Manufacturing Co., 19h, Broad Wynd, Leith.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.

Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.

White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL-FUEL INSTALLATION—

Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.

White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL IMPORTERS & BLENDEES—

Rimer Bros., Newcastle-on-Tyne.

PACKING (Engine)—

Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.

Walker, Jas., & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E.

PAINTS—

Briggs, W., & Sons, Ltd., Dundee.

Cocks, Harry, & Co., Cardiff.
Hamilton, Archd., & Co., Possilpark, Glasgow.

Hoyle, Robson, Barnett, & Co., Ltd., St. Nicholas Chambers, Newcastle-on-Tyne.

Willes Dove Bitumastic Ltd., 5, St. Nicholas Buildings, Newcastle-on-Tyne.

WEBSTERS LTD., HULL.

PANELLING—

Stewart, Archibald, & Co., 40-48, Union St., Glasgow

PATENT HAWSE PIPE AND DECK

FLANGE—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

PERFORATED METALS—

Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

Piggott, T., & Co., Ltd., Birmingham.

PIPES—

Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

Yorkshire Copper Works, Ltd., Leeds.

PLANING MACHINES for Plate Edges—

Scriven & Co., Leeds Old Foundry, Leeds.

PLATE BENDING ROLLS—

Scriven & Co., Leeds Old Foundry, Leeds.

PORCELAIN ENAMELLED CAST

IRON—
Levick, John, Alma Street, Aston, Birmingham.

PROPELLERS—

Billington & Newton, Ltd., Longport, Staffs.

Chambers, John, Ltd., Lowestoft. [Liverpool.
Crichton, C. & H., Ltd., Huskisson Engine Works.

Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

PROPELLER BLADES—

Billington & Newton, Ltd., Longport, Staffs.

Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald St., Glasgow.

PUBLICATIONS—

"Shipbuilding and Shipping Record," Queen Anne's Chambers, Westminster, London, S.W.

PULLEY BLOCKS—

Bullivant & Co., Ltd., 72, Mark Lane, London, E.C.

Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Cardiff.

Wright, Joseph, & Co., Ltd., Tipton, Staffs.

PUMPING ENGINES—

Central Marine Engine Works, West Hartlepool.

PUMPS—

[ing Works, Bedford.
Allen, W. H., Son & Co., Ltd., Queen's Engineer-

Beresford Eng'g Co., Beresford Lane, Cardiff.
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.

Davey & Co. (London), Ltd., 88, West India Dock Road, E.

Dawson & Downie, Elgin Works, Clydebank.
Edina Manufacturing Co., 19h, Broad Wynd, Leith.

Hall, J. P., & Sons, Ltd., Peterborough.
Mather & Platt, Ltd., Manchester.

Weir, G. & J., Ltd., Cathcart, Glasgow.

PUNCHING AND SHEARING

MACHINES—
Scriven & Co., Leeds Old Foundry, Leeds.

RADIATORS—

British Thomson-Houston, Co., Ltd., Rugby.

Low, Archibald, & Sons, Ltd., 76, Merkleland Street, Partick, Glasgow.

Royles Ltd., Irlam, Nr. Manchester.

RADIATOR TUBES—

Yorkshire Copper Works, Ltd., Leeds.

REAMERS—

Chatwin, Thos., Ltd., Gt. Tindal St., Birmingham.

REFRIGERATING MACHINERY—

Hall, J. & E., Ltd., Dartford Ironworks, Kent.

Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.

Sterne, L. & Co., Ltd., Crown Ironworks, Glasgow.

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Reynolds, A. & Co., Ltd., Hebburn-on-Tyne.

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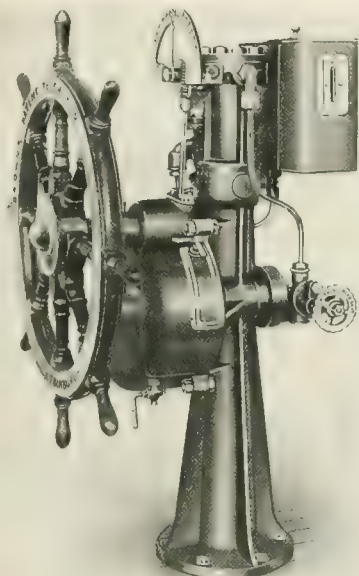
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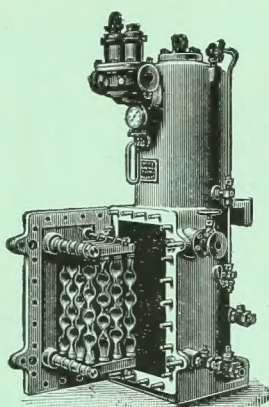
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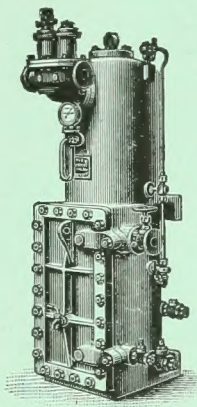
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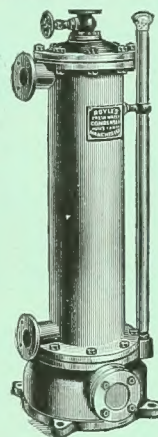
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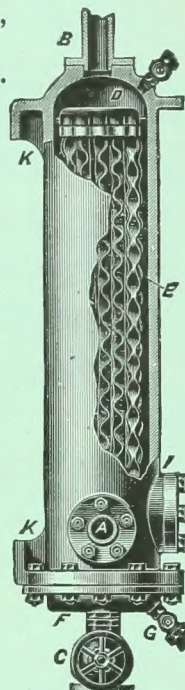
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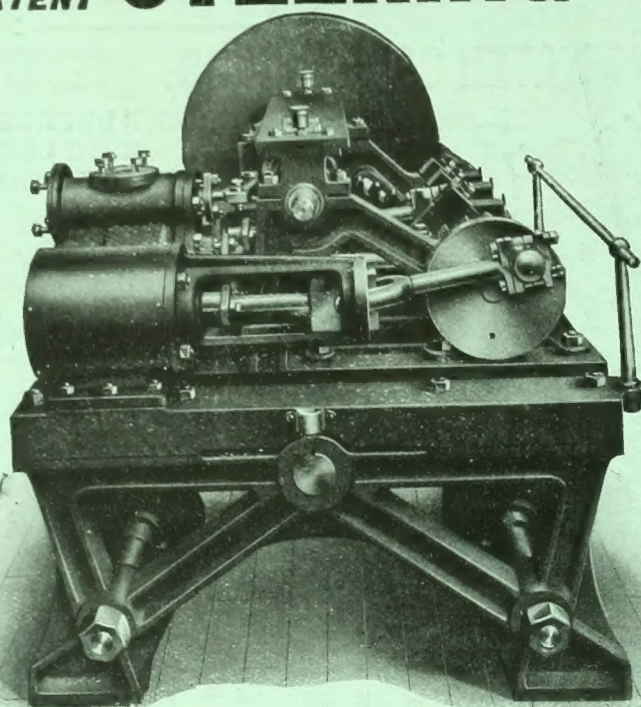
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